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GLOBAL WARMING
A Position Paper

Einstein and the Myth of Consistent Skepticism

Debunking *The Secret*

Theatre of Science

Published by the Committee for Skeptical Inquiry

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Inquiries from the media and the public about the work of the Committee should be made to Paul Kurtz, Chairman, CSI, P.O. Box 703, Amherst, NY 14226-0703. Tel.: 716-636-1425. Fax: 716-636-1733.

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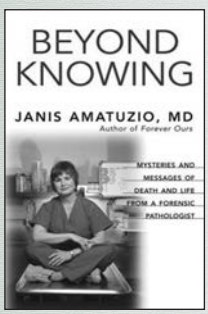
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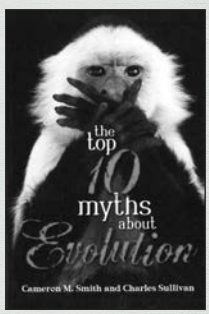

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Editor's Note

A Warming Climate for Climate Warming

Our report in this issue, "Global Climate Change Triggered by Global Warming," was in production when the Intergovernmental Panel on Climate Change (IPCC) released its Fourth Assessment Report on the physical-science basis for climate change, its first update in six years. The two reports complement and reinforce each other.

The report we're publishing was commissioned by the Center for Inquiry's new Office of Public Policy in Washington, D.C. It was written by veteran NASA scientist Stuart D. Jordan and vetted by a CFI review committee. It is a position paper of CFI, not specifically the SKEPTICAL INQUIRER, but we thought it readable, substantive, and important, and, as a result, well worth sharing with you in two parts.

Climate change has been a hot topic scientifically and politically for years. But the reports make clear that many of the former scientific uncertainties about the fact of warming have been resolved and its attribution mostly to human-caused greenhouse gases has been further strengthened. Research by thousands of scientists worldwide, published in the refereed scientific literature, provided the data making the case.

The CFI position paper points to "convincing evidence that Earth's climate is undergoing significant, and in some cases, alarming changes." It says global warming "is a *fact* confirmed by an enormous body of observations from many different sources." It calls the probability "extremely high" that human-generated greenhouse gases are the main culprit.

The IPCC report (see our News & Comment section for key excerpts) says the case for warming is now "unequivocal" and most of the observed increase in globally averaged temperatures since the middle of the twentieth century is "very likely" due to the observed anthropogenic greenhouse-gas concentrations. This is an advance since the IPCC third assessment report conclusion in 2001 that most of the observed warming is "likely" to have been due to increasing greenhouse-gas concentrations.

It is important for people to understand that these are consensus views—based on a multitude of scientific studies published in the literature and then reexamined, evaluated, and synthesized in the preparation of these reports. Key data include the fact that eleven of the last twelve years (1995–2006) rank among the twelve warmest years in the instrumental record of global surface temperature. Paleoclimatic data show the warming is unprecedented in at least the last 1,300 years. Eighty percent of Earth's glaciers are receding. And so on, and on.

There will continue to be global-warming skeptics, and their questions have been healthy, encouraging the collection of ever-better scientific data. That process will continue. Stuart Jordan directly addresses many of these skeptics' questions. (Might the warming be caused by variations in the sun? No. Might urban heat-island effects account for the warming? That effect has been accounted for and is negligible. Are climate scientists biased toward human causes? This ignores the actual dynamics of science. And so on.) One mark of a truly scientific mind is the willingness to change one's views as better evidence arrives. That has been happening. That attitude of openness to new data is recommended to everyone, including today's remaining global-warming skeptics.

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IPCC Climate Report Shows 'Unequivocal' Warming, Reduces Uncertainties

KENDRICK FRAZIER

The long-awaited international report summarizing the latest and best thinking of the world's scientists about climate change and global warming reinforces the concerns most individual climate scientists have been expressing.

The Intergovernmental Panel on Climate Change (IPCC) released the core segment of its Fourth Assessment Report (FAR), "Climate Change 2007: The Physical Science Basis," in February. The report strengthens and solidifies many of the conclusions that had been slightly more speculative at the time of the IPCC's Third Assessment Report in 2001.

(Many of the new report's conclusions are also mirrored in the position paper on climate change—written by NASA scientist Stuart D. Jordan and issued by the Center for Inquiry's Office of Public Policy—published in this issue, starting on page 32.)

The IPCC was established by the World Meteorological Organization and the United Nations Environmental Program to assess the scientific and socioeconomic information relevant to understanding climate change, its potential impacts, and options for adaptation and mitigation. The IPCC doesn't do research itself but assesses and evaluates the published scientific literature and attempts to provide a scientific-consensus appraisal. Scores of the world's leading atmospheric scientists and other researchers working on climate issues contributed to the report.

The report says the scientific progress made since the third assessment report in 2001 is based on large amounts of new and more comprehensive data, more sophisticated analyses of data, improvements in understanding of processes and their simulation in models, and more extensive exploration of uncertainty ranges.

On the next two pages, we publish substantial excerpts from the report's eighteen-page Summary for Policymakers. That summary and the full report are available electronically at www.ipcc.ch. Reports of the working groups on impacts, adaptation, vulnerability, and mitigation are expected later this year.

Kendrick Frazier is editor of the SKEPTICAL INQUIRER.

The chairman of the Intergovernmental Panel on Climate Change (IPCC), Rajendra Pachauri, speaks during a press conference at UNESCO in Paris, February 2, 2007. The UN climate panel issued its strongest warning yet that human activities are heating the planet, adding pressure on governments to do more to combat accelerating global warming. (UPI Photo/Eco Clement) [Photo via Newscom]

IPCC Report Excerpts

Here are key excerpts from the report:

Global atmospheric concentrations of carbon dioxide, methane, and nitrous oxide have increased markedly as a result of human activities since 1750 and now far exceed pre-industrial values determined from ice cores spanning many thousands of years. The global increases in carbon dioxide concentration are due primarily to fossil fuel use and land-use change, while those of methane and nitrous oxide are primarily due to agriculture.

- Carbon dioxide is the most important anthropogenic greenhouse gas. The global atmospheric concentration of carbon dioxide has increased from a pre-industrial value of about 280 ppm to 379 ppm in 2005. The atmospheric concentration of carbon dioxide in 2005 exceeds by far the natural range over the last 650,000 years (180 to 300 ppm) as determined from ice cores. The annual carbon dioxide concentration growth-rate was larger during the last ten years (1995–2005 average: 1.9 ppm per year) than it has been since the beginning of continuous direct atmospheric measurements (1960–2005 average: 1.4 ppm per year), although there is year-to-year variability in growth rates.
- The primary source of the increased atmospheric concentration of carbon dioxide since the pre-industrial period results from fossil fuel use, with land-use change providing another significant but smaller contribution.

The understanding of anthropogenic warming and cooling influences on climate has improved since the Third Assessment Report (TAR), leading to *very high confidence* that the globally averaged net effect of human activities since 1750 has been one of warming.

- The combined radiative forcing due to increases in carbon dioxide, methane, and nitrous oxide is +2.30 W m-2, and its rate of increase during the industrial era is *very likely* to have been unprecedented in more than 10,000 years. The carbon dioxide radiative forcing increased by 20 percent from 1995 to 2005, the largest change for any decade in at least the last 200 years.
- Anthropogenic contributions to aerosols (primarily sulphate, organic carbon, black carbon, nitrate, and dust) together produce a cooling effect, with a total direct radiative forcing of -0.5 W m-2 and an indirect cloud albedo forcing of -0.7 W m-2. These forcings are now better understood than at the time of the TAR due to improved *in- situ*, satellite, and ground-based measurements and more comprehensive modeling, but remain the dominant uncertainty in radiative forcing. Aerosols also influence cloud lifetime and precipitation.

Direct Observations of Recent Climate Change

- Since the TAR, progress in understanding how climate is changing in space and in time has been gained through improvements and extensions of numerous datasets and data analyses, broader geographical coverage, better understanding of uncertainties, and a wider variety of measurements. Increasingly comprehensive observations are available for glaciers and snow cover since the 1960s, and for sea level and ice sheets since about the past decade. However, data coverage remains limited in some regions.

Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level.

- Eleven of the last twelve years (1995–2006) rank among the twelve warmest years in the instrumental record of global surface temperature (since 1850). The updated 100-year linear trend (1906–2005) of 0.74°C is therefore larger than the corresponding trend for 1901–2000 given in the TAR of 0.6°C.
- The linear warming trend over the last Fifty years (0.13°C per decade) is nearly twice that for the last 100 years. The total temperature increase from 1850–1899 to 2001–2005 is 0.76°C. Urban heat island effects are real but local, and have a negligible influence (less than 0.006°C per decade over land and zero over the oceans) on these values.
- New analyses of balloon-borne and satellite measurements of lower- and mid-tropospheric temperature show warming rates that are similar to those of the surface temperature record and are consistent within their respective uncertainties, largely reconciling a discrepancy noted in the TAR.
- The average atmospheric water vapor content has increased since at least the 1980s over land and ocean as well as in the upper troposphere. The increase is broadly consistent with the extra water vapor that warmer air can hold.
- Observations since 1961 show that the average temperature of the global ocean has increased to depths of at least 3000 m and that the ocean has been absorbing more than 80 percent of the heat added to the climate system. Such warming causes seawater to expand, contributing to sea level rise.
- Mountain glaciers and snow cover have declined on average in both hemispheres. Widespread decreases in glaciers and ice caps have contributed to sea level rise (ice caps do not include contributions from the Greenland and Antarctic ice sheets).
- New data since the TAR now show that losses from the ice sheets of Greenland and Antarctica have *very likely* contributed to sea level rise over 1993 to 2003. Flow speed has increased for some Greenland and Antarctic outlet glaciers, which drain ice from the interior of the ice sheets. The corresponding increased ice sheet mass loss has often followed thinning, reduction, or loss of ice shelves or loss of floating glacier tongues. Such dynamical ice loss is sufficient to explain most of the Antarctic net mass

loss and approximately half of the Greenland net mass loss. The remainder of the ice loss from Greenland has occurred because losses due to melting have exceeded accumulation due to snowfall.

- Global average sea level rose at an average rate of 1.8 mm per year over 1961 to 2003. The rate was faster over 1993 to 2003, about 3.1 mm per year. Whether the faster rate for 1993 to 2003 reflects decadal variability or an increase in the longer-term trend is unclear. There is *high confidence* that the rate of observed sea level rise increased from the nineteenth to the twentieth century. The total twentieth-century rise is estimated to be 0.17 m.
- For 1993–2003, the sum of the climate contributions is consistent within uncertainties with the total sea level rise that is directly observed. These estimates are based on improved satellite and *in-situ* data now available. For the period of 1961 to 2003, the sum of climate contributions is estimated to be smaller than the observed sea level rise. The TAR reported a similar discrepancy for 1910 to 1990.

At continental, regional, and ocean-basin scales, numerous long-term changes in climate have been observed. These include changes in Arctic temperatures and ice, widespread changes in precipitation amounts, ocean salinity, wind patterns, and aspects of extreme weather including droughts, heavy precipitation, heatwaves, and the intensity of tropical cyclones.

- Average Arctic temperatures increased at almost twice the global average rate in the past 100 years. Arctic temperatures have high decadal variability, and a warm period was also observed from 1925 to 1945.
- Satellite data since 1978 show that annual average Arctic sea ice extent has shrunk by 2.7 percent per decade, with larger decreases in summer of 7.4 percent per decade. These values are consistent with those reported in the TAR.
- The frequency of heavy precipitation events has increased over most land areas, consistent with warming and observed increases of atmospheric water vapor.
- Widespread changes in extreme temperatures have been observed over the last fifty years. Cold days, cold nights, and frost have become less frequent, while hot days, hot nights, and heat waves have become more frequent.

Paleoclimate information supports the interpretation that the warmth of the last half century is unusual in at least the previous 1,300 years. The last time the polar regions were significantly warmer than present for an extended period (about 125,000 years ago), reductions in polar ice volume led to four to six meters of sea-level rise.

Most of the observed increase in globally averaged temperatures since the mid-twentieth century is *very likely* due to the observed increase in anthropogenic greenhouse gas concentrations. This is an advance since the TAR's conclusion that "most of the observed warming over the last fifty years is *likely* to have been due to the increase in greenhouse gas concentrations." Discernible human influences now extend to other aspects of climate, including ocean warming, continental-average temperatures, temperature extremes, and wind patterns.

- It is *likely* that increases in greenhouse gas concentrations alone would have caused more warming than observed because volcanic and anthropogenic aerosols have offset some warming that would otherwise have taken place.
- The observed widespread warming of the atmosphere and ocean, together with ice mass loss, support the conclusion that it is *extremely unlikely* that global climate change of the past fifty years can be explained without external forcing, and *very likely* that it is not due to known natural causes alone.

Baby, It's Warm Outside: 2006 Warmest Year on Record in U.S.

Last year's average annual temperature for the contiguous United States was the warmest on record, scientists with the National Oceanic and Atmospheric Administration's National Climatic Center reported in January.

Seven months in 2006 were much warmer than average, including December, which ended as the fourth warmest December since records began in 1895. The 2006 average temperature was 55 degrees F, which is 2.2 degrees F (1.2 degrees C) above the twentieth-century mean and a scant 0.07 degree F (0.04 degree C) warmer than 1998, the next warmest year.

"A contributing factor to the unusually warm temperatures throughout 2006 also is the long-term warming trend, which has been linked to increases in greenhouse gases," said a NOAA news release. "It is unclear how much of the recent anomalous warmth was due to greenhouse-gas-induced warming and how much was due to the El Niño-related circulation pattern."

NOAA said U.S. and global annual temperatures are now approximately 1.0 degree F (0.6 degree C) warmer than at the start of the twentieth century. The rate of warming has accelerated over the past thirty years, increasing globally since the mid-1970s at a rate approximately three times faster than the century-scale trend. NOAA said the past nine years have all been among the twenty-five warmest on record for the contiguous United States, a streak unprecedented in the historical record.

The values were calculated using a network of more than 1,200 U.S. Historical Climatology Research stations. The data, primarily from rural stations, have been adjusted to remove artificial effects resulting from urbanization and station and instrument changes.

Randi's Amazing Meeting Returns

James "The Amazing" Randi's fifth annual conference, dubbed "The Amazing Meeting" (TAM for short), was held in Las Vegas, Nevada, January 18 to 21, 2007. The theme was "Skepticism and the Media," and media-related speakers included *Scientific American* editor John Rennie and National Public Radio's Peter Sagal.

But it wasn't all bespectacled bald men such as Sagal discussing objectivity on the airwaves; the conference included an impressive selection of skeptical humorists. As Martin Gardner often said, quoting H.L. Mencken, "A horse-laugh is worth ten thousand syllogisms," and that was clear when Matt Stone and Trey Parker took the stage to discuss their dogma-defying, skeptical series *South Park*. SI readers may recall that the cartoon has satirized countless topics such as Scientology, alien abductions, creationism, and the New Age; in 2002 the show memorably referred to TV psychic John Edward as "the biggest douche in the universe." More razor-sharp skeptical humor came from Scott Dikkers of *The Onion*, America's finest news source.

Indeed, one of the main themes of the conference was the value of humor in critical thinking and skepticism. In a world where scientists and skeptics are often maligned as dour eggheads and party poopers, the conference managed to corral many of the top popularizers of skepticism in today's media: Penn and Teller's *Bullshit!* series, The Mythbusters, *South Park*, and *The Onion*. I gave my own contribution to the skeptical media skewering with the premiere of my short animated film *Clicker Clatter*, which will be screened at festivals later this year.

Returning Randi rabble-rousers included Phil "The Bad Astronomer" Plait (speaking about the moon-hoax story); Richard "The Wiseass" Wiseman (on his quest to find the world's funniest joke and Rupert Sheldrake's flawed animal ESP experiments); Adam "The Mythbuster" Savage; Penn "The Tall One Who Talks" Jillette; and others.

While most of the presentations were well-received, several were on a topic that had no clear connection to either skepticism or the media: the philosophy of libertarianism. Author and *Skeptic* magazine publisher Michael Shermer opened the conference with a keynote talk about evolutionary economy and libertarianism, while *Reason* magazine editor-in-chief Nick Gillespie discussed his libertarian publication. Penn Jillette is also an outspoken libertarian. While many skeptics share a natural ideological kinship with humanists, many attendees were left puzzled by the emphasis on libertarianism.

The conference was marred by sporadic technical difficulties ranging from Powerpoint lockups to sketchy sound, leaving several presenters awkwardly fumbling with cords and laptops while the audience fidgeted. On the whole, however, things went smoothly and the meeting was well organized.

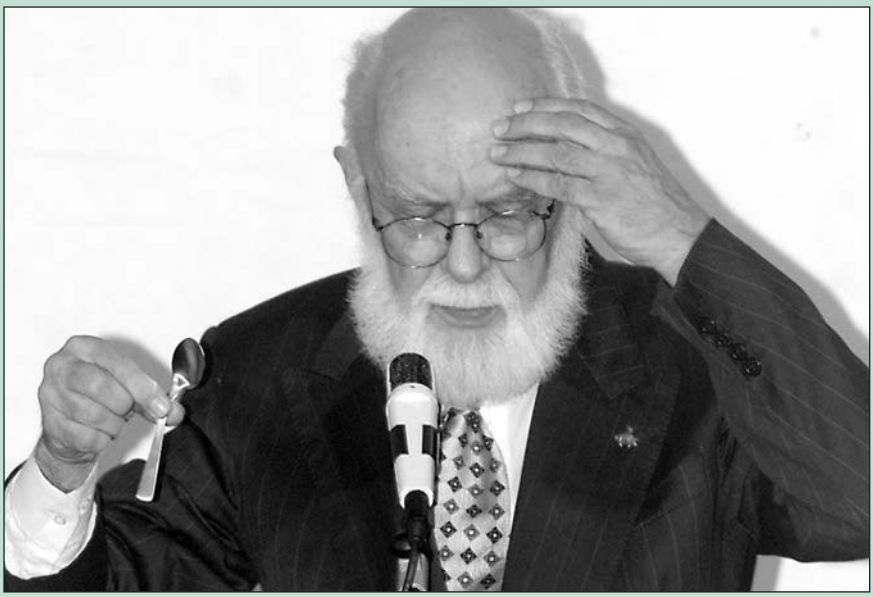
Randi, still amazing and sprightly at the age of nearly eighty (and following heart bypass surgery shortly after the last TAM), was ubiquitous, continually collared by press and fans alike. One unplanned highlight that fit in perfectly with the theme was Randi's appearance on CNN's *Anderson Cooper 360*, in which Randi was interviewed about a boy whom psychic Sylvia Browne said was dead but turned out to be alive (see "Sylvia Browne's Biggest Blunder," News & Comment, p. 12). The on-site interview was broadcast live, drawing applause upon Randi's return.

Randi also used the conference as an opportunity to announce a change in his tactics regarding psychics and his famous $1 million paranormal challenge. Noting that the challenge has been repeatedly ignored by Browne and other high-profile alleged psychics, Randi will more actively challenge the top psychics by name (including possibly full-page ads in major newspapers). The James Randi Educational Foundation will also help instigate class-action lawsuits against high-profile alleged psychics. This confrontational approach drew a hearty round of applause from the audience.

Entertainment was provided by musician Jill Sobule, writer and actor Julia Sweeney, mind-reader Banachek, and Randi's retinue of magicians and performers. Throughout the meeting, there was a strong emphasis on camaraderie and community; more than once the roomful of nearly 600 attendees was told, "You're among friends."

—Benjamin Radford

Benjamin Radford is the managing editor of the SKEPTICAL INQUIRER.



Celebrating Darwin Day with a New Play in L.A.

In a span of eighty years, the teaching and science of evolution has been under siege in America, from the 1925 Scopes trial to the 2005 Dover, Pennsylvania, trial about teaching intelligent design in science classes. What do these two trials tell us about science and religion today?

To address that question, the Center for Inquiry/West hosted a staged reading of a new play, *Darwin's Nightmare*, on February 12, Darwin's 198th birthday. Independent filmmaker and acting coach Frank Megna and Bob Ladendorf cowrote the play specifically for the event. Professional actors, including Academy Award nominee Robert Forster, enlightened and entertained nearly one hundred celebrants in CFI/West's Steve Allen Theater. After the hour-long, one-act play, Center staff pop-ped champagne and passed out birthday cake.

Sparked by an idea from CFI/West's Jim Underdown and Megna's interest in staging plays dealing with skeptic and humanist issues, work began on the play in late December.

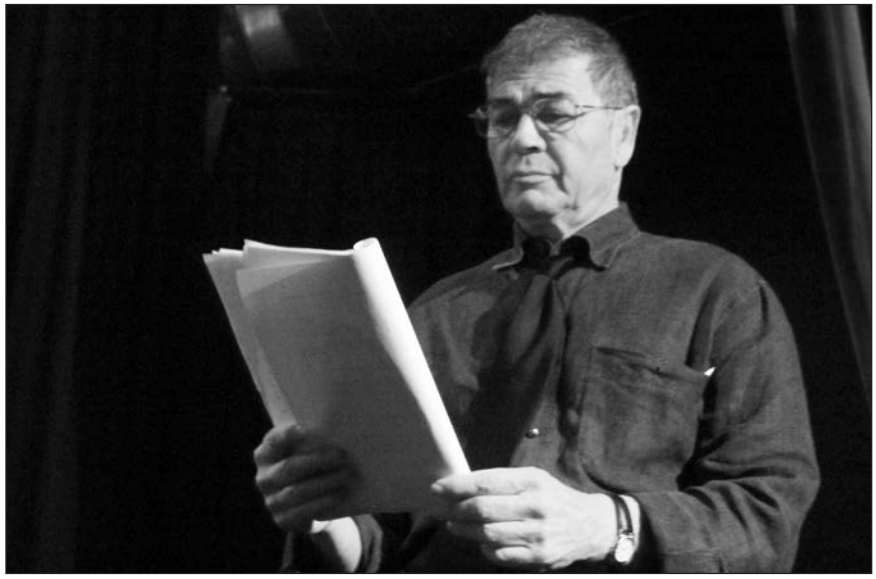
"Both cases underscored important concepts for the public," Underdown said, "not the least of which is the idea that science class content should come from a consensus of qualified scientists, not lawyers, orators, or politicians."

Darwin's Nightmare is an imaginative play that incorporates actual trial transcripts and quoted remarks in a fictional structure. A foreign female student (played by Yasmina Chirazi) researches both trials, bringing to life, and interacting with, Clarence Darrow (William H. Bassett), William Jennings Bryan (James Mathers), H.L. Mencken (Forster), and the judge in both trials (Tom Wagner). As he did at the Scopes trial, Mencken provides acerbic commentary that at times provoked laughter in the audience. The Darrow and Bryan actors doubled for the plaintiff lawyer and intelligent design proponent Michael Behe in the Dover trial segments. Framing the beginning and ending of the play was an audio recording by actor Rory Johnston quoting Charles Darwin, including the final paragraph of *The Origin of Species*.

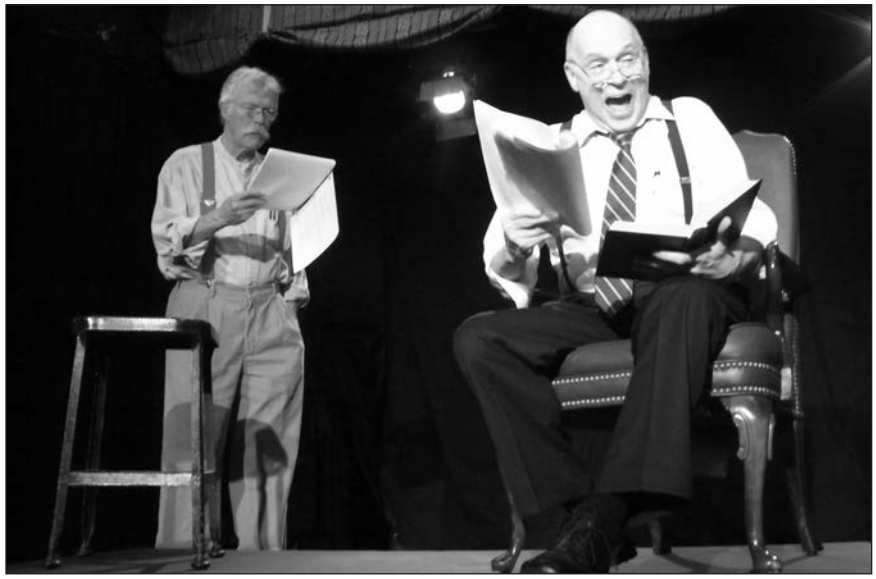
The actors, who were directed by Megna, had only one table reading and one rehearsal before participating in the staged reading. Megna and Ladendorf are expanding *Darwin's Nightmare* into a full play.

Darwin Day proponents find unique ways to recognize and honor Darwin, from sponsoring lectures to showing *Inherit the Wind*. Last year, more than sixty readers, including celebrity writers, filmmakers, and artists, read aloud the entire *Origin of Species* at the Center for Inquiry/West.

Evolution supporters lost legally in the Scopes trial (though the fine was overturned on appeal due to a technicality),



Actor Robert Forster, who was nominated for an Academy Award for Best Supporting Actor for *Jackie Brown*, read the part of iconoclastic journalist H.L. Mencken.



Actor William H. Bassett (left) as Clarence Darrow and the Dover plaintiffs' lawyer spars with James Mathers playing William Jennings Bryan and Michael Behe.

IGNITE THE ADVENTURE

The NEW FUTURE Fund

"Knowledge is an unending adventure at the edge of uncertainty."

– Jacob Bronowski, scientific polymath

For a more rational tomorrow ... and the future of *Skeptical Inquirer* ... please support the new phase of the Center for Inquiry New Future Fund

Across our world, forward-thinking men and women have recognized the scientific paradigm as their surest guide for sound thinking and living. For them knowledge is the greatest adventure. Today the Center for Inquiry movement strives to keep the adventure of knowledge accessible to all. To defend science, reason, freedom of inquiry, and human values in an ever-changing world, we must adopt new methods ... new approaches. To realize tomorrow's ambitious goals, we must expand our organization.

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- **Influencing public policy through our new Center in the nation's capital**
- **Enhancing the Committee for the Scientific Examination of Religion (CSER)**
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- **Transnational Development: reaching beyond borders through the United Nations and direct activism around the globe**

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CSI The Committee for Skeptical Inquiry

Toni Van Pelt, Paul Kurtz, and Ron Lindsay (standing); Lawrence Krauss, David Helfland, and Nobel Laureate Paul Boyer (seated) introduced the Declaration in Defense of Science and Secularism at the inaugural press conference of the Center for Inquiry/Office of Public Policy in Washington, D.C.

Local leaders, campus activists, and students from around the world came together at CFI's 2006 Summer Session.

Latin American and U.S. skeptical activists met at the CFI-sponsored First Iberoamerican Conference on Critical Thinking in Peru.

The new Naturalism Research Project will more than double our library facilities and create a collegial setting for scholarly dialogue and research.

but evolution won out in the Dover trial of 2005. In a direct quote in the play, Darrow comments: "If today you can take a thing like evolution and make it a crime to teach it in the public school, tomorrow you make it a crime to teach it in the private schools, and the next year you can make it a crime to teach it . . . in the church."

The lesson of Darwin Day is that we need to stay vigilant.

—*Bob Ladendorf*

Bob Ladendorf is the chief operating officer of CFI/West. As a freelance writer, he coauthored an article on "The Mad Gasser of Mattoon" in the July/August 2002 issue of Skeptical Inquirer. Darwin's Nightmare *is his first play.*

Car Carma Car-tastrophe

In December 2006, Lee Romanov, the president of the Toronto-based Insurance Hotline.com (it finds you the best rate from among about thirty insurance companies), announced the results of her survey of 100,000 North American drivers' records under the catchy title "Car Carma." "I was absolutely shocked," she said. "The results are overwhelming, showing drivers of certain astrological signs are prone to getting more tickets, while others seemed destined to have accidents." The story led to a minor media sensation and a summary in *Reader's Digest*.

Such surveys are perennially popular. Examples: in 1996, the Britain-based accident-and-insurance management company VELO analyzed 25,003 claims. In 1997, Gunter Sachs analyzed 67,992 convictions for hit-and-run and driving-without-a-license offenses taken from Swiss criminal records for 1986 to 1994. In 2002, Australia's Suncorp Metway financial-services group analyzed more than 160,000 claims, followed a year later by an analysis of an unspecified number of claims by Australia's car insurer AAMI.

What did they find? The table below shows which signs had the greatest and least numbers of offenders for each of the surveys that are listed above.

See how astrology can please most of the people most of the time. As a bonus, Gemini, Virgo, Capricorn, and Pisces can be seen as both worst and best, depending on which survey you fancy.

Astrologers might expect, respectively, Fire (reckless) and Earth (cautious) signs to be overrepresented in the above results, but they total only three hits versus the 3.5 expected by chance, which is hardly convincing support for astrology. For Car Carma accidents vs. VELO accidents across all twelve signs, the Spearman rank correlation coefficient is -0.38, which is neither significant (p=0.22) nor in the right direction (the negative value shows the results disagree more than they agree).

Such disagreement is normal for such studies, simply because the sign counters do not allow for demographic variations (some months have more births than others) and astronomical variations (some signs have more days than others). The last is due to Earth's elliptical orbit and has nothing to do with signs versus constellations.

There are also surprisingly strong variations due to an effect called "age incidence." Take anything dependent on age and counted by calendar year, such as possessing a driver's license, going to a nonjuvenile prison, or joining a senior football team, and Aquarians (born in January) will have had more time "at risk" than Sagittarians (born in December). If the counting period is set up differently than the calendar year, such as July to June, the relevant signs are different, but the principle is the same.

Finally, we cannot escape the natural variations that occur whenever we sample something. Even if we sample random numbers, something has to come first and last, and ranking the results will make small differences appear big. Nothing, of course, that would worry the media.

But even if we are aware of the above problems, the variations in birth frequencies between countries, years, places, and even within a place tend to be similar to the variations supposedly due to sun signs, which almost guarantees that counts of sun signs will be meaningless. If our sample is large enough (as in the above surveys), then these meaningless variations will reach an impressive level of statistical significance.

For informed critiques of sun-sign counting, including romance by the stars, see the entry for Sachs's *Astrology File* (under the heading "Sun Signs") at the Astrology and Science Web site (www.astrology-and-science.com).

—*Geoffrey Dean*

Geoffrey Dean is a technical editor in Perth, Western Australia, and a Fellow of the Committee for Skeptical Inquiry. He and his associates have been contributing critiques of astrology to SI since 1985.

	CAR CARMA		VELO		SWISS	SUNCORP METWAY	AAMI
	ACCIDENTS	TICKETS	ACCIDENTS	TICKETS	CONVICTIONS	ACCIDENTS	ACCIDENTS
Most-Offending Sign	LIBRA	PISCES	TAURUS	VIRGO	ARIES	GEMINI	CAPRICORN
Least-Offending Sign	LEO	GEMINI	SCORPIO	PISCES	SAGITTARIUS	CAPRICORN	VIRGO

Sylvia Browne's Biggest Blunder

The tragic consequences of listening to psychic advice were brought into sharp focus in January 2007, when yet another psychic vision from Sylvia Browne was revealed to be wrong. Several years ago during one of her many appearances on the *Montel Williams* show, Browne told the parents of missing child Shawn Hornbeck that their son was dead. His body, she said, would be found in a wooded area near two large boulders. Furthermore, according to Browne, Hornbeck was kidnapped by a very tall, "dark-skinned man, he wasn't Black, more like Hispanic," who wore dreadlocks.

According to a spokesman for the Hornbeck family, following the *Montel* broadcast Browne tried to get money from the family: "She called Pam and Craig about one month after the show and pretty much offered her services to continue their discussion for a fee. Pam was that desperate that if she had had $700 in her bank account she would have put it on the table. We are talking about a mother who would have sold her soul to have her boy back."

In fact, Hornbeck and another boy were found very much alive January 16, 2007, in the home of Michael Devlin, a Missouri man accused of kidnapping them. Hornbeck had been missing for four years, but his parents had not given up hope of finding him despite Browne's misinformation. Devlin, a Caucasian, is not Black, dark-skinned, nor Hispanic and almost certainly did not have dreadlocks at the time he allegedly abducted Hornbeck.

Within days of Hornbeck's recovery, critics such as James "The Amazing" Randi spoke out against Browne. CNN's Anderson Cooper featured Randi and gave refreshingly skeptical (and harsh) coverage of the case, calling attention to Browne's highest-profile failure to date. Browne, in a statement posted on her Web site, responded to the criticism, stating that "I have never nor ever will charge anyone who seeks my help regarding a missing person or homicide. In these cases I choose to work strictly with law enforcement agencies involved to aid and not impede their work and only when asked. To be accused of otherwise by James Randi and others like him is a boldface [*sic*] lie. . . . If the brilliant scientists throughout history had a James Randi negating every aspect of their work, I doubt we would have progressed very far in medicine or in any technology. . . . I cannot possibly be 100 percent correct in each and every one of my predictions."

Yet her documented track record is one of nearly 100 percent failure rate instead of 100 percent success. Browne's confidence in her body of work is baffling, and her claim that her flawed visions were "one human error" is an amazing understatement.

—Benjamin Radford

Sylvia Browne's Year to Forget

During the final week of each year Sylvia Browne boldly appears on the *Montel Williams* show to make her predictions for the upcoming year. Despite her low accuracy rate, followers and believers anxiously tune in with optimism that she has a sixth sense to "see" what will happen in the future.

In 2004 she wrongly predicted the United States would pull its troops out of Iraq, Martha Stewart would not go to jail, and Julia Roberts's marriage would end. Never mind that her followers are still lining up to pay $700 for a reading. In 2005 she wrongly predicted there would be an alcohol scandal with President Bush, Michael Jackson would go to prison, and Elizabeth Taylor would die. She even missed her "sure thing" prediction that Kurt Russell and Goldie Hawn would break up. Also in 2005, two fourth-grade classes out-predicted Sylvia by twenty percentage points on the same predicted measures. If you think 2004 and 2005 were bad years for Sylvia, it gets worse—much worse.

She began 2006 with the West Virginia coal mine tragedy. Sylvia was being interviewed on a live radio show—as the story broke—while simultaneously listening to fatality updates. After hearing erroneous reports (as we all did) that the miners were found alive, Sylvia confidently proclaimed on radio that "I *knew* they were going to be found [alive]. I hate people that say something *after* the fact." Then, after she heard the truth—that all but one was found dead—Sylvia changed her position (still live on the same radio program) by adjusting her answer to "I just don't think they are alive" (see SI News & Comment, March/April 2006).

Let's get to her formal 2006 predictions (the ones that are at least somewhat measurable) as she proclaimed on the *Montel Williams* show. Pay close attention to the italicized explanations to see how her periodic and apparent "accuracy" can sometimes be explained.

• **There will be at least thirty hurricanes**—*incorrect. There were twenty-one hurricanes in 2006.*

• **There will be earthquakes in India and Mexico**—*correct, but, according to the* U.S. Geological Survey (USGS), *there was also an earthquake in India in 2005 and two in 2002. The* USGS *also indicates there were earthquakes in Mexico in 2002 (two), 2003, 2004, and 2005 (two). So how "intuitive" was this prediction? Heck, I'll predict one for Mexico in 2007.*

• **Natural disasters in general will be as bad, or worse, than in 2005**—*possibly true, but the* Center for Research on Epidemiology of Disasters (CRED) *reveals that disasters are steadily increasing in recent decades (from seventy-eight in 1970 to 348 in 2004). It doesn't take psychic insight to predict this.*

• **John McCain and John Kerry run for president**—*you decide.*

• **No terrorist attacks on U.S. soil**—*terrorism expert John George tells me that there have been no foreign-instigated terrorist attacks on American soil since 1993. Thus, predicting no terrorist attacks on U.S. soil for 2006 was not a big stretch.*

• **Britney Spears divorces and marries a singer**—*she divorced, but did not marry a singer.*

• **Bruce Willis marries a nineteen or twenty-year-old woman**—*wrong. In fact, in one interview, he mentioned that he had an indifference to being remarried at all.*

• **Jennifer Aniston marries**—*wrong.*

• **Angelina Jolie and Brad Pitt marry**—*wrong.*

• **The hypothalamus will be linked to a treatment for Multiple Sclerosis and ALS**—*I found no evidence for this. The ALS Association (member of the* National Health Council*) Web site gives no results when entering "hypothalamus" into their search function.*

• **Advancement to take plaque out of heart arteries**—*it's true that research indicates high-intensity statin therapy caused a regression of atherosclerosis—but, if researchers conducted this experiment in 2006, there must have been suspicion in 2005 and preceding years that statin would be beneficial. Most of Sylvia's apparent "hits" are in areas where previous knowledge could be gleaned.*

• **Sudden Infant Death Syndrome (SIDS) is related to a dairy allergy for children**—*wrong. The* SIDS Network *provides only one link to a December 2006 article which stated, "SIDS is not caused by smothering, choking, infections, or allergies."*

• **Cancer vaccination will be approved for lung, colon, and stomach cancer**—Vaccine Weekly *reports the Food and Drug Administration (FDA) approved Taxotere in conjunction with Cisplatin and 5-flurouracil for some advanced stomach cancers. I'm not certain if this is technically considered a "vaccine"—but Sylvia realizes that in order for the FDA to approve something means there has been promising research in the area in recent years.*

• ***Hormone discovered that keeps weight off***—*wrong.*

• ***U.S. troops will begin returning from Iraq***—*embarrassingly for Sylvia, this is the third consecutive year she has made this prediction. I predict that eventually Sylvia will be right in "seeing" that the U.S. troops will be pulled out of Iraq. Keep predicting it, Sylvia—you'll be correct eventually.*

This accuracy (or lack thereof) is dismal for such an acclaimed psychic. Notice that any semblance of accuracy is only pertaining to researchable areas where trends could have been monitored (natural disasters, medical research, etc.). In areas where research is not available (such as celebrity weddings) she had no hits. Altogether, she was correct (not necessarily due to psychic ability) on a scant few, and incorrect on most—well below what most would expect by chance. I can't wait for the year 2010—which is when Sylvia predicts we will be visited by aliens. Did I mention that her followers are still lined up to pay $700 for a reading?

—*Bryan Farha*

Bryan Farha is a professor of behavioral studies in education at Oklahoma City University.

'Psychic' Evans Acquitted on Appeal in Swindling Case

In 2005, we published an article (May/June, "Psychic Swindlers") by Amy Davis, a television reporter then with WOAI-TV in San Antonio, Texas, about her investigation of a so-called fortune-teller named Jennifer Evans, who had bilked a group of clients out of money in excess of $200,000. Davis's reportage contributed to a case that was prosecuted in San Antonio by District Attorney Susan Reed's office, a trial that ended in a conviction on eight counts of theft by coercion and a sentence of twelve years in prison. We reported that conviction in a follow-up in News and Comment later that year (November/December 2005, "'Psychic Swindler' in San Antonio Convicted of Theft by Coercion"). More recently, however, the sentence has been overturned on appeal, and Jennifer Nicole Evans, aka Miss Brooks, has been acquitted of the charges.

In a judgment rendered by Justice Sarah B. Duncan for the Fourth Court of Appeals of Texas on December 27, 2006, reversing the conviction, it is stated: "Because there is legally insufficient evidence that Evans obtained her clients' money and property by 'coercion,' as that term is statutorily defined, we are constrained to reverse the trial court's judgment and render a judgment of acquittal."

The victims who were named in the original case were Connie Barrientes, Susan Kelly, Gregory Reiter, Yvonne Villareal, Sarah Deaver, Colleen Matsumura, Gloria Jimenez, Janette Rendon, and Shante Smith, the person who contacted WOAI for help. Evans's *modus operandi* was to draw in the "clients" by advertising fortune-telling and then warning them of some terrible threat. (Smith, for example, was told that her boyfriend would soon be facing colon cancer.) But Evans would offer to intervene and prevent the curse from doing its harm, usually by advising the client

to clean out her bank account and accumulate debt by purchasing expensive items to donate to charity (actually, for Evans's relatives). Evans would, if necessary, harass the client with reminders and further requests for more cash and purchases. (Smith gave Evans a total of at least $13,978.)

WOAI sent a member of its staff undercover to secretly videotape Evans's methods. This documentation was used as evidence in court. The conviction was obtained, and D.A. Susan Reed, in a letter, stated that she viewed the case as sending "a clear message to those who prey upon vulnerable victims" in Bexar County, Texas.

The acquittal was obtained not because of any question about the nature of Evans's business and techniques but rather because she was convicted of theft by *coercion* instead of theft by *deception*. To demonstrate coercion, under the definition given in the Texas Penal Code (§ 1.07[9][A]–[E]), prosecutors must show that the defendant has "threaten[ed] to take some affirmative act: commit, accuse, inflict, expose, or harm [the victim]." The appellate court found that this requirement was not met by prosecutors in the case of Jennifer Evans, as Evans made no direct threats, other than to withhold her services, i.e., supernatural intervention to prevent a threat from another source.

We are attempting to contact the Bexar County D.A.'s office to see if the matter will be dropped at this point or further pursued and re-prosecuted. But, as Maro Robbins, a reporter for San Antonio's *Express-News*, comments in an article dated December 27 ("Tarot reader wins appeal"), "Double jeopardy concerns would make it difficult for prosecutors to recharge Evans."

In response to news of the acquittal, Amy Davis expressed concern for Evans's victims: "Most of them were extremely hesitant to press charges and testify, worried that friends and family would think they were fools for being so easily duped. They were eventually convinced to work with prosecutors because they wanted to see Evans punished. I know that the Bexar County District Attorney's Office did all they could to prosecute Evans. I hope her victims don't regret coming forward to tell their stories."

—David Park Musella

David Park Musella is an assistant editor of the SKEPTICAL INQUIRER.

More Signers of Declaration in Defense of Science & Secularism

The following signers of the Declaration in Defense of Science and Secularism, issued by the Center for Inquiry's new Washington, D.C., office were inadvertently omitted from the list of original signers at the end of the text of the declaration in the March/April 2007 SKEPTICAL INQUIRER (pages 6–7):

Lawrence Krauss, PhD—Prof. of Physics and Astronomy, Case Western Reserve Univ., Cleveland, Ohio

Paul Kurtz, PhD—Prof. Emer. of Philosophy, SUNY Buffalo; Chairman, Center for Inquiry/Transnational

Ronald A. Lindsay, PhD, JD—Legal Dir., CFI/Office of Public Policy, Washington, D.C.

Jere H. Lipps, PhD—Prof., Museum of Paleontology, Univ. of California–Berkeley

Elizabeth Loftus, PhD—Dist. Prof. of Psychology and Social Behavior, Univ. of California–Irvine

Steve Lowe—Washington Area Secular Humanists

Kenneth Marsalek—founding member and past president, Washington Area Secular Humanists

Joe Nickell, PhD—Senior Research Fellow, CSI, at the Center for Inquiry, Amherst, New York

Matthew Nisbet, PhD—Asst. Prof. of Communications, American Univ.

Steven Pinker, PhD—author and Prof. of Psychology, Harvard Univ.

Elie A. Shneour, PhD—President and Research Director, Biosystems Research Inst., San Diego, Calif.

Peter Singer, PhD—Ira W. Dunlap Professor of Bioethics, Princeton Univ.

Victor Stenger, PhD—Prof. Emer. of Physics and Astronomy, Univ. of Hawaii

Edward Tabash, JD—Chair, First Amendment Task Force

Lionel Tiger, PhD—Prof. of Anthropology, Rutgers Univ.

Toni Van Pelt—Policy Dir., CFI/Office of Public Policy, Washington, DC

Edward O. Wilson, PhD—Pellegrino University Prof. Emer., Harvard Univ.

Several hundred additional people have signed the document since it was originally issued November 29, 2006. The full list of original signers and the names of additional signers are on the office's Web site at www.cfidc.org/declaration.html.

Philip Kitcher Awarded Inaugural $10,000 Prometheus Prize

Prometheus Books and the American Philosophical Association (APA) have selected Philip Kitcher, John Dewey Professor of Philosophy and the James R. Barker Professor of Contemporary Civilization at Columbia University, as the first recipient of the new Prometheus Prize. This prize honors a distinguished philosopher in recognition of his or her lifetime contribution to expanding the frontiers of research in philosophy and science.

The recipient is selected by the board of the American Philosophical Association and will deliver a lecture every two years at an APA conference.

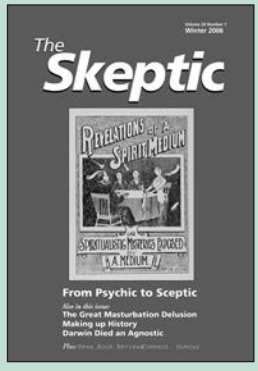
Designated a "Prometheus Laureate," Kitcher will receive a cash award of $10,000. Kitcher delivered the first Prometheus lecture, titled "Darwin and Democracy," at the APA Annual Meeting of the Eastern Division in Washington, D.C., on December 29, 2006, and has accepted a contract with Prometheus Books for a book that incorporates the ideas developed in this lecture.

The Prometheus Prize is awarded to an individual whose work demonstrates cooperation between science and philosophy and is known for breaking new ground in philosophy as it relates to the sciences. Kitcher's work focuses on general questions in the philosophy of science, problems in the philosophy of biology, and issues in the philosophy of mathematics. His current scholarly and research interests are the ethical and political constraints on scientific research, the evolution of altruism and morality, and the apparent conflict between science and religion.

Paul Kurtz, founder and chairman of Prometheus Books and professor emeritus of philosophy at the State University of New York at Buffalo, said: "There does not exist a Nobel Prize for philosophy. Philosophers historically have been interested in the frontiers of the sciences, and, with the extraordinary advances in the sciences today, it is especially important that the interrelation between science and philosophy be recognized and that philosophers should be encouraged to contribute to these advances." □

Ian Stevenson, Reincarnation Researcher, Dies at 88

Ian Stevenson, an academic psychiatrist and researcher into reincarnation and related paranormal beliefs, who amassed 2,500 case studies of children worldwide claiming to recall lives as other people in other places, died February 8, 2006, of pneumonia in Charlottesville, Virginia, at the age of eighty-eight. Stevenson published his studies in a series of technical books but did not manage to persuade many in the scientific and skeptical communities, who tended to regard him as well-meant but misguided, gullible, and too uncritical. He founded the Division of Perceptual Studies at the University of Virginia in 1967 and remained its head until his retirement in 2002.



The Skeptic (U.K.) Celebrates 20 Years

Congratulations to *The Skeptic* (U.K.), which is celebrating its twentieth anniversary.

The Skeptic is the United Kingdom's only regular magazine to take a skeptical look at pseudoscience and the paranormal. If *Free Inquiry* is the SKEPTICAL INQUIRER's sister magazine, *The Skeptic* is at least SI's cousin. *The Skeptic* was founded in 1987 by Wendy Grossman and is currently coedited in the U.K. by Chris French, from the Anomalistic Psychology Research Unit at Goldsmiths College, London, and Victoria Hamilton. It is published in Amherst, New York, by SI's publisher, the Committee for Skeptical Inquiry (CSICOP, until recently).

The Skeptic is a succinct magazine-style quarterly packed with short articles, reviews, columns, and letters. It focuses strongly, but not exclusively, on issues in the United Kingdom, and most authors are from there. Further information: www.skeptic.org.uk.

PEAR Lab Closes, Ending Decades of Psychic Research

STANLEY JEFFERS

The Princeton Engineering Anomalies Research (PEAR) group is shutting down after some twenty-eight years of searching for proof of the paranormal. On February 10, 2007, PEAR issued a press release that stated, in part: "The PEAR program was established at Princeton University in 1979 by Robert G. Jahn, then Dean of the School of Engineering and Applied Science, to pursue rigorous scientific study of the interaction of human consciousness with sensitive physical devices, systems, and processes common to contemporary engineering practice. Over the next twenty-eight years, an interdisciplinary staff of engineers, physicists, psychologists, and humanists has conducted a comprehensive agenda of experiments and developing complementary theoretical models to enable better understanding of the role of consciousness in the establishment of physical reality."

If it has been the long-term goal of the PEAR group to be featured in the mainstream literature, then they have finally achieved their goal. The imminent closure of the PEAR laboratory has been commented upon in both *The New York Times* (Carey 2007) and *Nature* (Ball 2007). The Canadian Broadcasting Company (CBC) featured a long and sympathetic interview with the director of PEAR, Professor Robert Jahn, on February 27. There are no plans by Princeton to continue to support work in this area. The university administration has maintained a discreet silence about the PEAR group and its remarkable research.

Stanley Jeffers is in the Department of Physics and Astronomy at York University in Toronto, Canada.

The startling claims of the PEAR group fall into the broad category of parapsychology, specifically psychokinesis (moving objects with the mind) and remote viewing (extrasensory perception). However, the PEAR team avoids terms such as *psychokinesis* and *telekinesis* in favor of less provocative terms such as *anomalous transfer of information* and *anomalous injection of information into the data stream.* The PEAR group has recently published a summary of the first twenty-five years of their work (Jahn and Dunne 2005). A critical analysis of some of the PEAR claims has recently appeared in this journal (Jeffers 2006).

Much of the work of the PEAR group has employed "random event generators" (REGs), which are essentially electronic random number generators whose "operators" are invited, by dint of their own intentionality, to bias in such a way that the mean of the random number distribution would be either higher or lower than it would be in the absence of their intentional efforts. The claim is that some "operators" can achieve a bias consistent with their intentions at a level that, although minute, is statistically very unlikely to have arisen by chance.

In his CBC interview, Professor Jahn stood fervently by his claims and said that he would repeat this long effort "in a heartbeat." He remains convinced that his work reveals something profound about the nature of mind and matter. However, it is somewhat telling that, despite this long record of experimentation, very few in the academy have been convinced of the validity of the claims. Most of the work has been reported in the *Journal of Scientific Exploration*, a periodical specializing in claims for all kinds of physical, biological, and parapsychological anomalous effects. Two papers have appeared in more mainstream journals, the *IEEE* (back in 1992) and *Foundations of Physics*. The attitude of most of the academy has either been immediate rejection without a close examination of the evidence or simple indifference. One notable exception is the support offered to the PEAR group by one Nobel Laureate in physics, Brian Josephson. One waggish editor did offer to publish a PEAR paper "if it could be transmitted telepathically."

The work of the PEAR group does raise larger issues for the academy concerning academic freedom. Princeton, to its credit, has recognized Jahn's freedom to pursue a controversial area despite the obvious discomfort of some of the faculty, particularly in the physics department.

As with any other claim, the veracity of PEAR's claims will finally be settled by time-honored methods of science—and demand reproducibility. Here PEAR has a significant problem. To its credit, PEAR did engage two other groups of researchers at two different German universities in a three-way attempt at validating the claims. However, none of these groups—including PEAR itself—was able to reproduce the claimed effects.

Furthermore, as has been previously pointed out, there are some problems with the calibration data of PEAR's REG. As far back as 1987 (Jahn and Dunne) the PEAR team claimed that the performance of their REGs when no one was invited to influence them showed a distribution that was better than Gaussian. This effect was dubbed "baseline bind." It was attributed to

the *unconscious* actions on the part of "operators" to please the experimenters (how one can test for *unconscious* intentionality is unclear). However, the baseline data reported later over a long period exhibits a trend that is unlikely by chance at the p=.05 level. This was the level of statistical significance previously employed to claim a significant effect. I have argued that the later data exhibit baseline bias and hence the REG over the long term is not generating random numbers as claimed. This has to call the basic claims into question.

Although the PEAR lab will be no more, work in this area is expected to continue under the auspices of the International Consciousness Research Laboratories, a not-for-profit public foundation. One suspects that, without the cachet that attaches to the Princeton name, this group will have an even more difficult time convincing the skeptical community.

References

Ball, P. 2007. When research goes PEAR shaped. Available at www.nature.com/news/2007/070212/full/070212-6.html.

Carey, B. 2007. After 28 years, Princeton loses ESP lab to the relief of some. *The New York Times*, February 10.

Jahn, R.G., and B. Dunne. 1987. *Margins of Reality: The Role of Consciousness in the Physical World.* Harcourt Brace Jovanovich.

———. 2005. The PEAR proposition, *Journal of Scientific Exploration*, 19, (2), 195–246.

Jeffers. 2006. The PEAR proposition—Fact or fallacy? SKEPTICAL INQUIRER, 30 (3): 54–57, May/June.

Snake-Oil Traders

EDZARD ERNST

Gillian McKeith

"The practice of medicine is an art, not a trade; a calling, not a business." It amazes me over and over again how this rather obvious statement by Sir William Osler, written a century ago, is so overtly ignored in complementary/alternative medicine (CAM) today. Many columnists who use the British media for informing the public about the virtues of CAM do so, I suspect, because they are financially profiting from it.

The ethics of advertising in medicine have been hotly debated for decades. The British Medical Association has traditionally been against a liberal stance, arguing that people who seek medical advice are vulnerable to exploitation. Thus the extent to which doctors advertise their services is subject to fairly tight restrictions. The guidelines of the General Medical Council (GMC), the governing body of doctors in the United Kingdom, state that the information doctors publish must not make unjustifiable claims, offer guarantees of cures, or exploit patients' vulnerability or lack of medical knowledge. The GMC also insists that doctors declare any relevant financial interest. If doctors do have interests in organizations providing health care or in pharmaceutical or other biomedical companies, these must not affect the way they prescribe for, treat, or refer patients. Most medical organizations across the world have adopted similar rules.

One only needs to watch television or read a newspaper to get the impression that, in the realms of CAM, such regulations are not often followed. For instance, Gillian McKeith, the author of a bestseller on nutrition, gives medical advice to families addicted to seriously misguided diets in her British television series called *You Are What You Eat*. A laudable task, one might think. But one does not need to look far to see that a whole range of health foods and supplements are commercially available under McKeith's own label. Conflict of interest? Hard to deny, I think! So why does the GMC not remind her of a doctor's responsibility? The answer is simple: contrary to what one might think after watching her show, she is not a medical doctor.

Neither is the "Barefoot Doctor," though for many years he wrote on health matters for *The Observer* and simultaneously marketed a range of medicinal products. Does the lack of a medical title absolve these people from ethical behavior, or does the way

Edzard Ernst, MD PhD, is at the Peninsula Medical School, Universities of Exeter and Plymouth.

they are portrayed as doctors add insult to injury?

Dr. Ali, by contrast, quite clearly claims to be a medical doctor. He treats many British notables and writes regularly in the *You Magazine* of the *Daily Mail*. Rumor has it that he advises Prince Charles, and he has published several best-selling books. In his regular column, he also openly advertises his extensive range of alternative health products. Financial interest? No doubt! Ethical behavior? I have my doubts.

Sarah Brewer is another prominent British "media doctor." On her Web site she states that her first love is medicine but her major passion is writing. The ex-general practitioner contributes columns for a range of publications, including *The Daily Telegraph*, and has about two dozen books to her name. She also has developed her own range of supplements available at outlets such as Boots, Tesco, and Superdrug. Do we smell a conflict of interest? I think it would be hard to deny.

Imagine the medical director of a pharmaceutical company publishing self-care books and writing regular columns in the daily papers on matters of health care. Would we not find this odd? Would we not, at the very minimum, insist that the conflict of interest be disclosed fully? Would the readers of such articles trust the advice given? Why, I wonder, do we accept things in CAM as entirely normal that would be unacceptable in conventional medicine? Why do we tolerate health writers making a fast buck by breaking established rules of medical ethics?

I have no doubt that such practice can be harmful. First, these articles have a strong potential for misleading people and tempting them to spend money needlessly. Jerome K. Jerome had an eye for the amusing side of this phenomenon: "I never read a patent medicine advertisement without being impelled to the conclusion that I am suffering from the particular disease therein dealt with in its most virulent form." But, come to think of it, exploitation of vulnerable people is not really all that funny. Second, such behavior puts CAM at the level of the snake oil traders. I believe that some forms of CAM have a lot of potential. Sacrificing it on the altar of self-interests is a disservice to everyone except the snake oil traders themselves.

A week of adventure for Inquiring Minds ages 7–16 years.

July 15–21, 2007—Holland, NY

Join us this summer (or send your kids or grandkids) for Camp Inquiry 2007. From July 15th through the 21st, children in age groups 7–12 years and 13–16 years, along with Junior Counselors, 17 years and older, will embark on a week-long adventure of discovery and exploration. Twenty miles south of Buffalo, in Western New York, lies a breathtaking campground with over 400 acres of wilderness. Camp Inquiry takes place at the Empire State Lodge within the Camp Seven Hills property in Holland, New York. Along with staff and guest visitors, campers will experience the fun and exciting sides of inquiry-based learning. Our themes of science, critical thinking, skepticism, and secular humanism unfold through engaging activities for boys and girls of different ages. We will investigate the realms of the paranormal and supernatural and apply the skeptic's toolbox of reason and rationality. Campers will be introduced to the ethical concerns that we confront in our daily lives and participate in character-building workshops. Through magic and illusion, we will see how our minds can easily be fooled, and we will learn to recognize the nonsense thrown our way. The nature of hands-on, minds-on activity will provide campers with a powerful approach to making sense of the world around them—a way of thinking that will last a lifetime. Along with our unique focus, we will enjoy traditional camp activities, such as swimming, games, crafts, and campfires. We will participate in a field trip of fossil hunting, nature hikes, and stargazing. For more information, please visit us online at www.campinquiry.org or contact Amanda Chesworth at a.human@mindspring.com.

Third Strike for Columbia University Prayer Study: Author Plagiarism

BRUCE FLAMM

Readers of SI may remember my 2004 exposé of one of the most outrageous scandals in the history of medical research (Flamm 2004). In 2001, *The New York Times* reported that researchers at prestigious Columbia University Medical Center in New York had made an astounding discovery. Anonymous prayers from people in the United States, Canada, and Australia had fully doubled the success rate of complex IVF infertility treatments performed on patients in Korea. The study's three authors were Kwang Cha, the director of the Cha-Columbia Infertility Medical Center, Rogerio A. Lobo, the chairman of the Department of Obstetrics and Gynecology at Columbia University, and Daniel Wirth, a mysterious man with no medical or scientific training.

To many readers, the bizarre study stunk to high heaven, and *The Journal of Reproductive Medicine* (JRM) was immediately bombarded with calls and letters from skeptical scientists and physicians. But things quickly went from bad to worse when the editors would not respond to calls and would not publish any letters critical of the supposedly miraculous study.

Strike One: Felony Fraud

The *JRM* editors' head-in-the-sand tactics successfully suppressed criticism of the study for two and a half years. It appeared that the "pray-for-pregnancy" study would never be removed from the legitimate scientific literature. Then, something quite unexpected happened. In June 2004, newspapers and magazines worldwide announced that prayer-study coauthor Daniel Wirth had been arrested by the FBI and had pled guilty to a twenty-year history of criminal fraud (Quackwatch 2004). Mr. Wirth, the man who allegedly designed and conducted the prayer study, was sentenced to five years in a federal prison (Flamm 2005). One down, two to go.

Strike Two: Deception

Staggered by the revelations about Wirth, the *JRM* editors finally broke their silence and announced that they had temporarily removed the controversial Cha/Wirth/Lobo study from their Internet site. However, they stopped short of retracting the prayer publication. After all, there were still two credible authors who could verify the study's miraculous results. Or could they? Beating a hasty retreat, Columbia University quickly announced that Professor Rogerio Lobo had only provided editorial assistance and actually had nothing to do with the *alleged* research and thus could not support the results or even verify that any data were ever collected. Shockingly, the study's lead author, the professor who had touted the study's supernatural results on the nationally televised *Good Morning America* show, now admitted he knew nothing about the research! Gerald Fischbach, dean of the Faculty of Medicine at Columbia University, reprimanded the disgraced Dr. Lobo and instructed him to remove his name from the absurd paper. And so he did (Carey 2004). Two down, one to go.

Mr. Wirth, the man who allegedly designed and conducted the prayer study, was sentenced to five years in a federal prison.

Strike Three: Plagiarism

The Cha/Wirth/Lobo paper suddenly morphed into the Cha/Wirth paper. Of the two remaining authors, one now resided in a federal penitentiary and the other slipped quietly away from Columbia University to run the Cha Fertility Center in Los Angeles. Undaunted, Lawrence Devoe, editor in

Bruce L. Flamm is a clinical professor of obstetrics and gynecology at the University of California, Irvine. He is the author of several medical books, book chapters, and research articles, and he has covered this case from the beginning. E-mail: bruceflamm@aol.com.

chief of the *JRM,* decided that things were quieting down and it was time to replace the prayer study on his journal's Web site. And so he did. For the next two years, Devoe steadfastly refused to respond to critics and declined to retract the nonsensical study. Once again, it seemed that the flawed and almost certainly fraudulent study would never be excised from the legitimate scientific literature.

year is that of the dragon. The doctor's astrological credentials apparently remain uncontested. A credible author? Strike three.

Game Over?

On February 20, 2007, *The Chronicle of Higher Education* published an article about Kwang Cha's problems. When the *Chronicle* asked DeCherney at *Fertility and Sterility* what he thought about the validity of the 2001 Cha/Wirth prayer study, he revealed a remarkable fact. His journal had seen the manuscript before it was sent to the *JRM* and rejected it. "It's baloney," he said. "That's not in question."

Not a single credible author remains to support the outlandish study, and there is absolutely no reason to believe the absurd results.

But fact is sometimes stranger than fiction. Yes, this story is about to take yet another almost unbelievable twist. On February 18, 2007, the *Los Angeles Times* reported that Kwang Cha, the only remaining unincarcerated author of the Cha/Wirth paper, had committed plagiarism (Ornstein 2007). After a long investigation, Alan DeCherney, editor in chief of *Fertility and Sterility,* announced that a 2005 article by Kwang Cha et al. was a word-for-word, chart-for-chart copy of a paper previously published by a different author in a Korean medical journal.

In addition to plagiarism, Cha may have some other problems. According to the *Los Angeles Times*, Cha appears to be violating state law by using M.D. after his name on Web sites and in news releases in California, in spite of the fact that he is not licensed to practice medicine in the state. Cha still claims to be a professor of obstetrics and gynecology at Columbia University, although the medical school's dean states that this was never the case (Cha 2007). Cha's Web site also indicates that his astrological sign is Sagittarius and that his Chinese zodiac

Not a single credible author remains to support the outlandish study, and there is absolutely no reason to believe the absurd results. Yet it remains unretracted, stinking up the scientific medical literature. Sadly, the outrageous and unprecedented behavior of the editor of the *JRM* has damaged evidence-based medicine and the credibility of the scientific literature. How can anyone decide what articles can be relied upon for correct information if articles known to be fraudulent are not retracted?

Clearly, the Cha/Wirth/Lobo study has been demolished. Yet, the defenders of this preposterous publication just sit there, out of excuses, dazed and confused, waiting, perhaps, for divine intervention.

This story might be humorous if not for the fact that barbarians are clawing at the gates of the universities and medical schools that scientists and critical thinkers have valiantly struggled to build. Science is under attack by people who want schools to teach that the earth is 6,000 years old, that evolution is a foolish theory, and that faith-healing is more efficacious than modern medical care. During the past ten years, courses stressing the potential health benefits of spiritual beliefs have been integrated into the curriculum of the majority of U.S. medical schools (Fortin and Barnett 2004; Puchalski and Larson 1998). The intractable resolve of those who have defiantly fought to protect the Cha/Wirth/Lobo prayer study should be a wake-up call for all who support science and evidence-based medicine. If mystics can win this battle, they should have no problem defending future faith-based "miracle" studies.

References

Carey, Benedict. 2004. Researcher pulls his name from paper on prayer and fertility. *The New York Times* (December 4). Available at: www.nytimes.com/2004/12/04/science/04prayer.html?ex=1259902800&en=c2a3e6baeb4f5ebe&ei=5088&partner=rssnyt.

Cha, Kwang Yul. 2007. User profile. Blogger Web site. January. Available at: www2.blogger.com/profile/05830505851878978098.

Flamm, Bruce. 2004. The Columbia University "miracle" study: Flawed and fraud. SKEPTICAL INQUIRER 28(5) (September/October): 25–31. Available at: www.csicop.org/si/2004-09/miracle-study.html.

———. 2005. The bizarre Columbia University "miracle" saga continues. SKEPTICAL INQUIRER 29(2) (March/April 2005): 52–53.

Fortin, Auguste H. VI, and Katherine Gergen Barnett. 2004. Medical school curricula in spirituality and medicine. *Journal of the American Medical Association* 291(23) (June 16): 2883. Available at: http://jama.amaassn.org/cgi/reprint/291/23/2883.pdf.

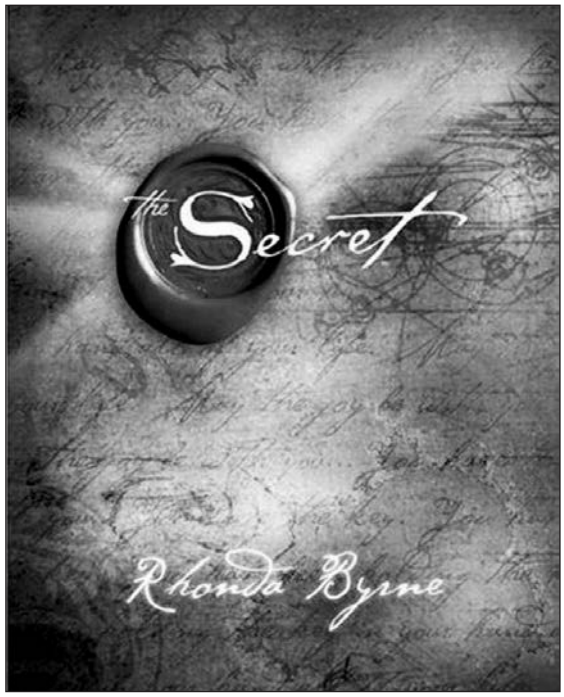
Ornstein, Charles. 2007. Credit for U.S. journal article at issue. *Los Angeles Times* (February 18). Available at: www.latimes.com/news/printedition/california/la-me-research18feb18,1,2222823.story?coll=la-headlines-pe-california.

Puchalski, Christina M., and David B. Larson. 1998. Developing curricula in spirituality and medicine. *Academic Medicine* 73(9) (September): 970–974. Available at: http://academicmedicine.org/pt/re/acmed/abstract.00001888-199809000-00015.htm;jsessionid=FhzHqyG7Nc99Q8np3pn0LWR8GHnXQkH5wcghJNpSWJwNcxQTYJvv!-1480123504!-949856144!8091!-1.

Quackwatch. 2004. Indictment of Josepf Horvath and Daniel Wirth. Quackwatch Web site. June 1. Available at: www.quackwatch.org/11Ind/wirthindictment.html. □

Secrets and Lies

MARY CARMICHAEL and BENJAMIN RADFORD



Last year, Rhonda Byrne discovered the secret of the universe. It is based on a principle of quantum mechanics and lies in a force with direct physical effects on matter. If you're thinking it's odd that such a momentous discovery hasn't been publicized—surely it deserves at least a journal article or two?—you clearly haven't been spending much time in the self-help section of your local bookstore, where Byrne's new book is found. Tantalizingly titled *The Secret*, it's probably the most slickly marketed idea to draw on quantum physics in all of history. Alas, though, it won't be appearing in *Science* or *Nature*. "The Secret," it turns out, is a lie.

Propelled by the gushing enthusiasm of Oprah Winfrey and a clever advertising campaign, *The Secret* has topped the best-seller lists and moved nearly two million copies to date. The book has a companion DVD film, whose "hidden knowledge" themes bear more than a passing resemblance to *The Da Vinci Code* and the ironically titled *What the Bleep Do We Know?*

The first warning sign that something is amiss is a common one—the author is a self-appointed expert whose main source is a personal inspiration or revelation. Byrne, a documentary producer, traces her "discovery" of the "secret" to a downtrodden period in her life. Give her this: she didn't fold. Instead, she drew on a poorly understood scientific theory, a few common-sense principles, and, most heavily, a nineteenth-century American philosophical movement with roots in quackery. She co-opted William Shakespeare, Thomas Edison, Abraham Lincoln, and other prominent people as co-bearers of her secret, then rounded up a panel of twenty-four contemporary teachers: self-help gurus and metaphysicians, a few MBAs, a feng shui expert, and two fringe quantum physicists who weren't fully informed about her theories before the cameras started rolling. Voila: a semblance of scientific accuracy. Out of this patchwork she made a movie (available for download online for just $4.95!) and accompanying book.

The problem is that neither the film nor the book has any basis in scientific reality. The Secret, Byrne states, lies in a New Age idea called the "Law of Attraction": that similar things attract each other, so positive thoughts bring positive things and negative ones bring negative things. Of course, in physics, it is *opposites* that attract, but never mind that: according to Byrne, our thoughts send out vibrations that the universe (or some unspecified power) can somehow decipher and respond to. Therefore, goes the dubious logic, we have only to think very hard about the things we want, and we will get them. If you want to lose weight, Byrne writes, you'll first have to accept that "food is not responsible for putting on weight. It is your *thought* that food is responsible for putting on weight that actually has food put on weight."

Mary Carmichael is a general editor for health and science at Newsweek. *Benjamin Radford is author of* Media Mythmakers: How Journalists, Advertisers, and Activists Mislead Us *and managing editor of the* SKEPTICAL INQUIRER.

If that example leaves you scratching your head, author Lisa Nichols, featured in the film, explains that "Every time you look inside your mail expecting to see a bill, guess what? It will be there. You're expecting debt, so debt must show up. . . . Every day you confirm your thoughts. Debt is there because of the Law of Attraction. Do yourself a favor: Expect a check!" Doesn't that make sense? According to *The Secret*'s economic insights, the problem is not our bills or debt; the problem is that we are *expecting* those pesky bills! One wonders how much time Oprah spent skimming the book before agreeing to promote this half-baked twaddle.

There's also an ugly flipside: if you have an accident or disease, it's your fault. There is of course a grain of truth to this: if a drunk wanders onto a highway and is hit, it's likely his fault; if a lifelong smoker gets lung cancer, it's likely her fault. But is *everything* we experience of our own making? If an airplane crashes, does that mean that one or more of the passengers brought that on himself? Do soldiers killed in Iraq simply not think enough positive thoughts?

Some of Byrne's supporters write off this troubling aspect by arguing that the Law of Attraction is a metaphor. It's not; Byrne herself has said so. It is a literal statement that you are what you think. "It's a real belief that our thought can shape, control, and direct this powerful force in the universe, that it sets in motion energies that go out into the atmosphere," says Robert Fuller, a professor of religion at Bradley University who has studied metaphysical beliefs.

To make the idea sound less preposterous, Byrne cloaks it in irrelevant but snazzy-sounding scientific terms. Without identifying the "observer effect"—the idea from physics that observing a process alters its outcome—she leans on its philosophical implications. She also summons up "quantum entanglement," the little-understood theory that, at the subatomic level, particles influence each other's behavior in ways that aren't yet fully clear to scientists. Neither theory applies to weight loss, credit-card bills, or for that matter anything else above the scale of atoms. The book also doesn't offer any explanation of how the universe supposedly reads our thoughts and responds to them. "She is invoking quantum physics," says Beryl Satter, professor of history at Rutgers, "to people who don't know a lot about quantum physics." For all the scientific language in *The Secret,* then, there is very little science in it. "Very few people actually trained in scientific thought are attracted to this," says Fuller. "But most of us aren't trained in scientific thought."

None of this is to say *The Secret* doesn't have intellectual roots. It does—although they aren't in science at all. They're in "New Thought," a metaphysical movement with a long history of invoking science to justify profoundly unscientific claims. New Thought has its roots in the showmanship of Franz Mesmer, the Austrian physician who began experimenting with hypnosis in 1775. Mesmer's key concept of "animal magnetism" is "very much like what Byrne is talking about with 'attraction,'" says Fuller. The traveling doctor claimed to be able to manipulate magnetic fields within and between people's bodies by passing his hands over them and putting them in passive, sleeplike trances. Do-it-yourself showmen started traveling through New England, imitating Mesmer and working as "healing hypnotists" themselves.

In 1838, one of these, a young clockmaker named Phineas P. Quimby from Maine, claimed to be able to put a seventeen-year-old boy into a trance. The boy would then diagnose people's illnesses. Quimby laid out the principles that would become New Thought, which he largely lifted from Mesmer. "He argued that there was a powerful, mighty, spiritual force in the universe—it was a little like The Force in *Star Wars*," says Fuller. "If you thought negatively, you'd close yourself off from it and you would lack emotional composure, physical vitality, even economic prosperity." Sound familiar?

The roots of pseudoscience grow strong near the septic tank of misinformation, and the Law of Attraction has other pseudoscientific kin as well. It takes a special sort of arrogance for a layperson to proclaim that he or she is so brilliant as to have discovered a heretofore unknown law of the universe simply by inspiration, but there are plenty of people who fit the bill. Just as Byrne believes she discovered The Secret, Samuel Hahnemann "discovered" the universal "Law of Similars" in 1790 when he developed the disproven quackery of homeopathy. He concluded that "like cures like," so that, if a drug produces symptoms similar to a disease, then taking that drug will relieve the symptoms of that disease.

The Secret, therefore, is nothing new, nor is it a secret. It's a time-worn trick of mixing banal truisms with magical thinking and presenting it as some sort of hidden knowledge: basically, it's the new New Thought. New Age bookshelves are overflowing with authors who claim to know and reveal the secrets of the universe. If any of these self-help books—written in the 1800s or written today—really contained the secrets to success and happiness, the self-help industry would of course be out of business. "The buyers for these books are people who bounce from one self-help gimmick to the next," says Terence Hines, professor of psychology at Pace University and author of *Pseudoscience and the Paranormal.* "It's almost like they're addicted to it. They buy the book and it doesn't work, so they jump on the next pseudoscientific bandwagon."

The Secret will indeed bring happiness, success, and prosperity—for Rhonda Byrne, her publisher, and bookstores. If the past is any indication, those who buy her book will be the losers; after the fad and hype die away and the disillusionment sets in, most will be returning to the self-help sections for yet more easy answers. □

Deciphering Da Vinci's *Real* Codes

The quintessential Renaissance man, with personas ranging from architect to zoologist,[1] Leonardo da Vinci was also something of a cryptographer, and much attention has been given his various "codes"[2]—both real and imagined, the latter most famously in Dan Brown's popular mystery novel, *The Da Vinci Code* (2003).

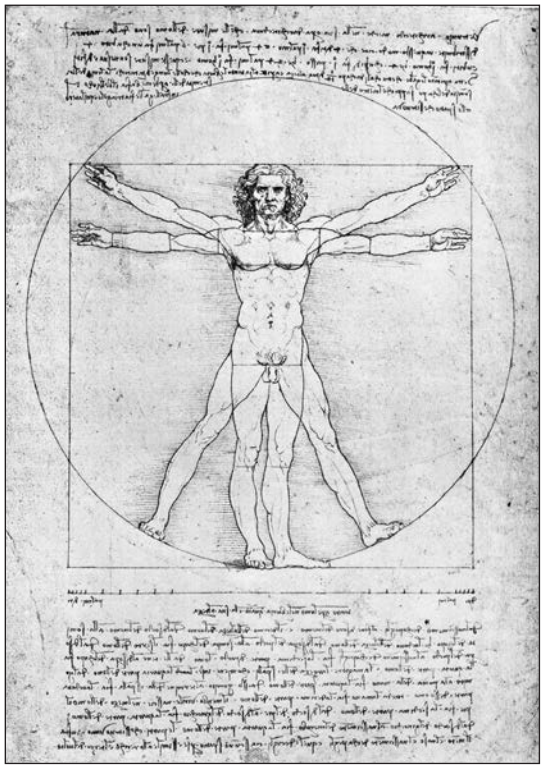


Figure 1. Drawn and written in mirror fashion is Leonardo da Vinci's famous *Vitruvian Man* of 1490—representing Renaissance ideals of humanism and harmonious proportion (after the works of first century B.C. Roman engineer Vitruvius). (Reproduced from Richter 1883.)

Da Vinci's 'Codes'

Although *The Da Vinci Code* is fiction, Brown claimed portions were based on fact, notably that a secret society called the Priory of Sion was "a real organization" founded in 1099 and that parchments brought to light in 1975, *Les Dossiers Secrets*, named among its members Leonardo da Vinci (2003, 1). Alas, the parchments "were conclusively proven in the 1990s to have been part of an elaborate hoax" (Bernstein 2004, 9).

The hoax had snookered the authors of two pseudohistories, *Holy Blood, Holy Grail* (Baigent et al. 1996) and *The Templar Revelation* (Picknett and Prince 1998), on which Brown relied. The coauthors of *The Templar Revelation*, "researchers" Lynn Picknett and Clive Prince, had made a previous foray into nonsense (1994) with the claim that Leonardo had created the Shroud of Turin, even though the shroud appeared a century before the birth of Leonardo (1452–1519). The duo believe the image on the cloth (actually the work of a confessed forger of the mid-1350s [Nickell 1998])—was produced for two reasons. It represented both "an innovative technique" (Leonardo, they suggest, *invented photography* to create the image!) and "an encoded heretical belief" (he supposedly faked blood on the image as still flowing so as to indicate that Jesus did not die on the cross) (Picknett and Prince 1998, 25, 289).

For his novel, Brown borrowed from a chapter of *The Templar Revelation* titled "The Secret Code of Leonardo da Vinci." There, Picknett and Prince (1998, 19–35) claim that Leonardo's famous fresco *The Last Supper* contains hidden symbolism relating to the true Holy Grail. Supposedly the old French word *Sangreal* is explained not as *san greal*, "holy grail," but as *sang real*, "royal blood," revealing that Jesus married Mary Magdalene and fathered a child, thus beginning a bloodline that led to the Merovingian dynasty (a succession of kings who ruled present-day France from 481 to 751). The hoaxed parchments, *Les Dossiers Secrets*, provided evidence of this allegedly historically guarded secret.

Picknett and Prince claim, for instance, that St. John, depicted in *The Last Supper* and seated at the right of Jesus, is actually a woman—Mary Magdalene—and that the shape made by "Mary" and Jesus is "a giant, spreadeagled 'M,' almost as if they were literally joined at the hip but had suffered a falling out or even grown apart" (Picknett and Prince 1998, 19–21). In this and some of the artist's other works, the authors imagine, are hidden clues to an underground religion based on the *sang real* secret.

By following such ridiculous sources, Brown provokes one critic to observe that his characterizations "bear little resemblance to the serious thinking in the field" of Leonardo studies and reveal "a stunning lack of careful knowledge" about his subject (Bernstein 2004, 12).

Joe Nickell, Ph.D., is the author of numerous books, including Pen, Ink, & Evidence *and* Unsolved History. *His Web site is at www.joenickell.com.*

Cryptex

In *The Da Vinci Code*, the hero and heroine follow a series of cryptic clues to solve the mystery. At the beginning, some numbers are discovered scribbled on the floor beside the body of the murdered Jacques Saunier. Heroine Sophie Neveu, Saunier's granddaughter, happens to be a "cryptographer" (actually a *cryptanalyst*, one who solves, rather than creates, secret writings). She recognizes the numbers as a scrambled Fibonacci sequence (a mathematical progression derived by another Leonardo, Leonardo Fibonacci [ca. 1170–ca. 1240]) and it enables her and her fellow quester, "symbologist" Robert Langdon, to unlock a safe box in a Zurich bank.

Inside they discover a *cryptex*, a device whose invention is attributed to Leonardo da Vinci. However, not only did he not conceive the imagined gadget but, as Brown describes it, it would not work. Supposedly it contains a scroll that can only be gained by lining up its dials correctly; smashing it open will break a phial of vinegar that will "quickly dissolve the papyrus," so that "By the time anyone extracted the secret message," Sophie explains, "it would be a glob of meaningless pulp" (Brown 2003, 201).

In fact, vinegar has no such effect on papyrus, which—since I am quite familiar with that writing material (Nickell 1990, 71)—I already knew instinctively; however, in honor of Leonardo, I confirmed that by a simple experiment in my lab. There was no appreciable affect even after weeks.

'Code' Script

In Brown's tale, the rosewood box containing the cryptex also yields an engraved riddle, itself rendered in a baffling script that is finally recognized as mirror writing. That backward form was employed by Leonardo throughout his celebrated notebooks (see figure 1). People have long puzzled over his reason for so writing, one popular hypothesis being "to keep people from peering over his shoulder and stealing his ideas," notes Brown (2003, 301). Indeed some have even called it a code, a possibility supposedly made more credible by Leonardo's having "often employed codes and ciphers to disguise his ideas further" (White 2000, 131). Specifically, it has been pointed out "that in very specific circumstances Leonardo would invent code writing (for example, in the so-called Ligny memorandum of about 1499, recording the artist's journey to Rome with the count of Ligny)." As well, he "created playful rebuses and cryptic pictographs" (Bambach 2003, 33).

For a time, when he feared two German assistants were spying on him, his writings reflect anxiety and "are written not only in his usual mirror-writing but heavily encoded, with imagery more at home in alchemical texts than his notebooks" (White 2000, 250). Iris Noble (1965, 139) has suggested that his treatise *De Figura Umana* (*On the Human Figure*) was so "dangerous" in exploring anatomy even through dissections of corpses that "He wrote it in mirror language because he knew well that times would have to change before that book could be printed for all to see."

But is that really the case? Leonardo definitely intended that book—along with many other treatises in progress—for publication. And as one writer observes, "the labor of writing backward would surely have been out of all proportion to the secrecy value, since the script could be read by anyone with a mirror" (Linscott 1957, xiii). Besides, Leonardo copied much extraneous and innocuous material into his notebooks in backward script, including portions of a Latin grammar, various quotations, even jokes (Linscott 1957, xiii).

Others have suggested that the mirror-writings could be due to dyslexia (Priwer and Phillips 2005, 210); however, the fluency of their exposition and elegance of reasoning as well as their quantity and even the stylish calligraphy of some early notes are scarcely consistent with such a diagnosis. Moreover, Leonardo was apparently also to some extent ambidextrous and could employ conventional, left-to-right script when necessary, as in writing letters. That has been disputed, but now the scholarly consensus is that occasionally he did do so (Bambach 2003, 33, 44).

Most knowledgeable authorities now attribute the backward penmanship to Leonardo's having been left-handed. The earliest testimony of that fact comes from his close friend and collaborator, Fra Luca Pacioli (ca. 1445–ca. 1514), who stated that Leonardo "wrote in reverse, [his script] is left-handed and could not be read except with a mirror or by holding the back of the sheet against the light. As I understand, and can say, this is the practice of our Leonardo da Vinci, lantern of painting, who is left-handed" (qtd. in Bambach 2003, 32).

The right-to-left mode would have been an advantage to a left-handed writer, since otherwise the hand would trail over and smear the wet ink (unless its position or that of the paper was radically altered). Having chosen to write in reverse fashion, Leonardo would no doubt have enjoyed its fringe benefits: its difficulty of being deciphered by casual readers, and the attention he gained from the novelty of performing such a trick.

Another Possibility?

Over the years (by 1983), I had begun to wonder if Leonardo might have received another benefit from his mirror-writing. I was intrigued that there is an important art form that actually utilizes mirror-writing and drawing; indeed, it is one that Leonardo would have been very familiar with. In fact, while there is no clear evidence that he practiced that art himself, he is known to have made the preliminary drawings—for another such practicing artist to copy—to illustrate his friend Pacioli's treatise *De Divina Proportione* (*On Divine Proportion*) (White 2000, 153).

The art I am referring to is that of printmaking—either by engraving or woodcut. To make prints, the respective copper plate or wood block is carved (incised for the former, cut in relief for the latter) *in reverse* (Nickell 1992). Thus, the plate is a mirror image of the print it makes.

Since Leonardo intended his works to be published, might not he have taken advantage of his left-handed ability to write in reverse in order to assist future mirror-writing artisans in copying his

text? Although many books of his time were set in moveable type (following its introduction ca. 1450 and its first use in Italy in 1465 [Nickell 1990, 127]), woodcuts and engravings were still also common. Engraved copper plates could have seemed an ideal method of reproducing Leonardo's pages with their interwoven illustrations and text.

One immediately thinks of arguments for and against this hypothesis, but serious investigators learn to avoid drawing firm conclusions too quickly. (I frequently encounter people who are such bright, quick thinkers that they finish my sentences for me—often incorrectly. Over time, I have been trying to teach myself to think more slowly, that is, more carefully.) I approached the puzzle of Leonardo's "code" writing as if (and I have had some experience in this regard[3]) I were solving a cryptogram.

In the notebooks, not only is Leonardo's text reversed but apparently drawings are as well, some diagrams being so indicated by the fact that their sequential letters—*a*, *b*, *c*, etc.—run from right to left (see, e.g., illus. in Bambach 2003, 598). Moreover, Carmen C. Bambach (2003, 51), curator of Drawings and Prints at the Metropolitan Museum of Art, observes that the evidence indicates Leonardo was a "'natural' left-hander" and that

> He had an uncanny mental ability to reverse, as if in a mirror, both writing and images fluently; not all left-handed artists have this ability. Preliminary drawings show that he seems often to have tried out mirror images of a similar compositional idea, perhaps to stir up his creative juices in designing the figural arrangements of his pictures. This unusual, very prominent feature of his creative process has been little discussed by scholars.

Although Leonardo put little of his material in final order, he did keep most of his observations to a single page, noting carefully if they were continued (Richter 1883, xv). Of course, not all of his scattered pages were intended for publication; some were simply sketches and drawings per se, while others bore mundane notations and reminders. Yet some were like a set of studies of the human skull, begun in 1489, that "reveal a neat, treatiselike disposition of image and text on the page (as well as the technique of exquisitely fine parallel hatching that is typical of engravings from this period)" (Bambach 2003, 15). Were Leonardo's pages of this type actual models for a future engraver? Might he have at least been aware of his mirror-writing's utility in this regard?

. . . Or Not?

Clearly there is a similarity between, on the one hand, certain of Leonardo's pages that were apparently intended for publication, and, on the other, the engraved copper plate that could have reproduced them as conventional (non-reversed) pages to be read by others. Even if it was just a coincidence, Leonardo must have noticed and appreciated the fact of the similarity.

As I studied the matter, I realized the need to find among Leonardo's figures—that is, among those that were seemingly intended for publication—one or more that were unmistakably mirror-imaged.

What I found, however, placed me in the unfortunate position of having to debunk, or at least urge skepticism of, my own hypothesis. It came in the form of a drawing of 1490 that "may have been intended to illustrate a treatise on anatomy" (Bambach 2003, 409). Labeled the "tree of veins" and illustrating internal organs in a pioneering cutaway view of a male figure, it places the heart on the figure's left, that is, in non-reversed fashion. The same is true of a 1508 anatomical drawing of a female, and still others (White 2000, 284; *Leonardo* 1956, 369, 371, 377).

This seems clear evidence against my otherwise very intriguing hypothesis. Of course, there may be something in the idea after all. At least, it might inspire others to take a fresh look at Leonardo's great gifts to us. Perhaps, avoiding the silliness of the pseudohistorians who have abused and slandered him, they will decode some further secrets of his genius.

Acknowledgments

I appreciate the assistance of artist/art scholar Glenn Taylor, who made helpful criticisms of my Leonardo mirror-writing-for-engraving hypothesis, and CFI Libraries Director Timothy Binga, for research assistance.

Notes

1. At least, Leonardo did architectural drawings (and was an occasional architectural consultant), and he studied animals, sketching their form and movements, visiting slaughterhouses to observe still-beating hearts, studying the flights of birds, etc. (Phillips and Priwer 2006, 103–116, 190–191, 126–127).

2. Although the term *code* is often used very loosely, cryptanalysts distinguish between a *code* (where arbitrary symbols, words, etc., stand for certain *whole concepts*, such as words, phrases, or the like) and a *cipher* (in which *letters* of the "plaintext" are transformed—by substitution or transposition—to conceal its meaning).

3. See the illustrated short treatise on "Secret Writing" in my book, *Pen, Ink, & Evidence* (Nickell 1990, 176–178); see also my decipherment of the Oak Island mystery's cipher-stone text and symbol-ridden allegory (Nickell 2001, 219–234).

References

Baigent, Michael, Richard Leigh, and Henry Lincoln. 1996. *Holy Blood, Holy Grail*. London: Arrow.

Bambach, Carmen C., ed. 2003. *Leonardo Da Vinci: Master Draftsman*. New Haven, Conn.: Yale University Press.

Bernstein, Amy D. 2004. Decoding the Da Vinci phenomenon. In *Secrets of the Da Vinci Code*, collector's edition, *U.S. News and World Report*, 7–15.

Brown, Dan. 2003. *The Da Vinci Code*. New York: Doubleday.

Leonardo da Vinci. 1956. New York: Reynal & Company.

Nickell, Joe. 1990. *Pen, Ink & Evidence: A Study of Writing and Writing Materials for the Penman, Collector, and Document Detective*. Reprinted, New Castle, Delaware: Oak Knoll Press, 2000.

———. 1992. The techniques of printed illustration. In Martin F. Schmidt, *Kentucky Illustrated*, Lexington, Kentucky: University Press of Kentucky, 1992, 3–4.

———. 1998. *Inquest on the Shroud of Turin*. Amherst, New York: Prometheus Books.

———. 2001. *Real-Life X-Files: Investigating the Paranormal*. Lexington, Kentucky: University Press of Kentucky.

Phillips, Cynthia, and Shana Priwer. 2006. *The Everything Da Vinci Book*. Avon, Massachusetts: Adams Media.

Picknett, Lynn, and Clive Prince. 1994. *Turin Shroud: In Whose Image? The Truth behind the Centuries-Long Conspiracy of Silence*. New York: HarperCollins.

———. 1998. *The Templar Revelation: Secret Guardians of the True Identity of Christ*. New York: Touchstone.

Priwer, Shana, and Cynthia Phillips. 2005. *101 Things You Didn't Know About Da Vinci*. Avon, Massachusetts: Adams Media.

Richter, Jean Paul. 1883. *The Notebooks of Leonardo Da Vinci: Compiled and Edited from the Original Manuscripts*, in two vols.; reprinted New York: Dover Publications, 1970.

White, Michael. 2000. *Leonardo: The First Scientist*. New York: St. Martin's Press. □

Can There Be a Science of Free Will?

A splendid article by Dennis Overbye in *The New York Times* (January 2, 2007) gave me the impetus to talk about one of those never-ending philosophical debates that may be about to be settled by science: is there such a thing as free will? The concept of free will is inherently vague, which has frustrated philosophers for centuries. What do we mean by "free"? Are we talking about the human ability to engage in decision making? But other animals, and even computers, can make decisions. Or is free will about choices made independently of external (environmental) or internal (genetic) causal factors, in which case, it begins to sound suspiciously like magic?

Perhaps the philosopher who has gotten closest to a sensible understanding of free will is Daniel C. Dennett (for example, in his book *Elbow Room* [MIT Press, 1984]). Dennett rejects any non-naturalistic view of free will, and thinks of the phenomenon (as he put it to Overbye of the *Times*) as a result of both biological and cultural evolution, "the power to veto our urges and then to veto our vetoes . . . the power of imagination, to see and imagine futures." He goes on to say that it is our ability to "see" ahead with our minds, to play in our heads several possible causal scenarios, that "makes us moral agents. You don't need a miracle to have responsibility."

Over the last few decades, science has made small but significant advances in understanding the relationship between conscious and unconscious thought, and the data are beginning to paint a picture that seems to validate Dennett's views. The opening salvo was probably the now-classic study by Benjamin Libet in the 1970s. He wired people to an electroencephalogram and measured when they reported having a particular conscious thought about an action, say by pushing a button, and when the nerve impulses corresponding to the initiation of the actual action started. Astoundingly, the latter came first: that is, subjects had actually made (unconsciously) the decision to act measurably earlier than when they became aware of it consciously. The conscious awareness, in a sense, was a "story" that the higher cognitive parts of the brain told to account for the action. It's as if the conscious brain was not the decider but simply the spokesperson.

So, one possibility is that science may be showing us that free will is more a feeling than a real manifestation of independent will. As Dan Wegner, a Harvard psychologist quoted in the *Times* article put it, "We see two tips of the iceberg, the thought and the action and we draw a connection." In so doing, we commit a classic logical fallacy, the *post hoc ergo propter hoc* ("after that, therefore because of that"), as when sports fans jump to the conclusion that a particular sweater brings luck because their team won a couple of times when they were wearing the sweater. Is free will the ultimate superstition?

Libet's position is a bit more moderate and is akin to Dennett's. Again in Overbye's article, Libet says that free will is a form of veto power, filtering and sometimes blocking decisions provisionally made at the unconscious level. In this sense, the difference between unconscious decision making and free will may be similar to the one—also emerging from research in cognitive science—between intuition and rational thinking: what we call "intuitions" are really the raw results of massive, unconscious parallel processing of data, and the higher cognitive functions are in charge of filtering intuitions to eventually produce refined hypotheses about the world, which leads to further data processing and testing, and so on.

From time to time, another science is brought into discussions of free will, this one for no good reasons whatsoever: quantum mechanics. As is well known, quantum mechanics is a favorite of supporters of pseudoscience, because it is very technical and, more important, incomprehensible enough to lend that aura of scientific credibility

Massimo Pigliucci is a professor of evolutionary biology and philosophy at Stony Brook University, a fellow of the American Association for the Advancement of Science, and the author of Denying Evolution: Creationism, Scientism, and the Nature of Science. *His essays can be found at www.rationallyspeaking.org.*

without committing one to specific details. So, now and again, both philosophers and scientists suggest that perhaps the solution to the "problem" of free will—but what is the problem, exactly?—lies with occasional quantum fluctuations that, by interfering with subcellular phenomena in the brain, create a partial decoupling of our decision making processes from the standard macroscopic laws of causality.

This is nonsense, not only because we have absolutely no evidence of "quantum fluctuations" (whatever they are) at the brain level but because, even if they did happen, they would—at most—generate random, not free, will. And random will is not one of those varieties of free will that is, in Dennett's words, "worth having."

Another source of confusion between science and philosophy when it comes to free will, nicely discussed in Overbye's article, is to be found in the rather vague concept of "emergent properties," e.g., the notion of free will being an emergent property of the higher brain's functions. Some scientists react to any mention of emergent properties by reaching for their (usually metaphorical) guns, partly because it also has been abused by believers in a variety of pseudoscientific fluff. However, "emergence" can actually be studied scientifically, and it is a rather common phenomenon. For example, when hydrogen and oxygen combine to form water, the resulting molecule has emergent physical-chemical properties, in the sense that its behavior (e.g., the temperatures marking transition states) is not a simple function of the properties of the individual atoms. No magic, just the observation that the world isn't put together by the simple linear addition of a few types of building blocks.

Some philosophers have argued that emergence restricts the limits of reductionism not because it isn't "physics all the way down," but because, frankly, a quantum mechanical description of, say, the Brooklyn Bridge—while theoretically possible—isn't going to be very helpful. Emergence entails that certain phenomena are best studied, and understood, at some levels of analysis rather than others, and free will may well fall into this category. To say that it is an emergent property of the brain is not a call for magic or pseudoscience, just the realization that neurobiology and psychology are better positioned than quantum mechanics to understand it. □

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The Devious Art of Improvising: Third and Final Lesson

Over the past two columns, I have examined the art of improvising seemingly paranormal feats. For this final entry, I have saved the most ingenious and extraordinary stunt I have ever heard of. It is an exploit of James Randi—who else?—and it certainly places him high among the ranks of such notables as James Bond and Arsène Lupin.

In November 1974, when Uri Geller's comet was still burning bright, Randi was invited to be a guest on a Canadian television show titled *ESPecial People* on the Global Television Network. The host was journalist Alan Spraggett, a strong believer in the paranormal, and the main subject of the talk show was the hottest psychic topic since the times of Margery: Geller, of course.

Spraggett was convinced that Geller was the real thing and that Randi, claiming that he could duplicate Geller's feats, was only a bragging skeptic, unable to really do what he claimed. Randi agreed to be on the show, but only on the condition that he would not be asked to perform.

It was clear that, to prove his point, Spraggett would never allow Randi the friendly atmosphere and relaxed conditions that Geller received almost wherever he went. And, since these easygoing manners were essential in order to "prepare" for the wonders that would later be shown on camera, it was pointless for Randi to even try to demonstrate anything.

Spraggett accepted Randi's caveat and invited him only to chat about the paranormal. Or so it seemed. . . .

Massimo Polidoro is an investigator of the paranormal, author, lecturer, and cofounder and head of CICAP, the Italian skeptics group. His Web site is www.massimopolidoro.com.

Tricking the Trickster?

The day of the show, Randi arrived late, accompained by his assistant Moses Figueroa. They were both soaking wet from a heavy rain and were immediately escorted to the control room, where they dried off a bit. Walter B. Gibson—a friend of Houdini and the author of the famous *Shadow* detective stories—was present in the control room, along with two other program guests.

An interview was already underway, so Randi waited for his turn. "I was not particularly apprehensive," he said, "since I was not under any pressure to perform, and was there only to be interviewed."

Randi was soon introduced in the studio, and the interview started. They were only a few minutes into it when Spraggett started pressuring Randi for a performance. If he was so good a magician, Spraggett said, and if Geller was using magic tricks, Randi should be able to do the same things right on the spot.

Randi was quite furious; though he had said that he would not perform, Spraggett was demanding Randi do so under quite impossible conditions. Suddenly, Spraggett took two oversized, sturdy spoons from his desk and challenged Randi to bend them. They were not at all similar to the spoons that Geller had bent for Spraggett.

Without ever letting them go, Spraggett held the handles of the spoons and Randi lightly stroked the bowls. Then, the journalist discarded one spoon and they concentrated on the other. Spraggett agreed that at no time did Randi put undue pressure on them. After a moment, the spoon suddenly seemed to become like plastic, sheared off, and broke into two pieces. Spraggett lost some color in his face.

"The spoon," Spraggett said, trying to find an explanation for what had happened, "was bent as you were picking it up . . . uh, and, uh . . . this is a phenomenon, of course, of . . . in previously bending it so that there is a stress point, and then with a little bit of leverage, it separates quite neatly."

In fact, as can be seen on the video recording of the show, Randi never had a chance to hold the spoons in his hands and never picked them up: Spraggett held them the entire time, and Randi only stroked the bowls. Spraggett's explanation makes no sense.

Next, Spraggett produced a nail from his pocket, but Randi "passed" on this test. The journalist got some color back on his face, but it wasn't there for long. There is a technique that's used in con games in which the con artist wins a

little, then loses, and then seems ready to lose very big in order to reel in the victim. On the nail, Randi appeared to be losing his edge, but, in truth, he was getting ready to pull the fish into his net.

Backfire!

Spraggett reached into his inner jacket pocket and extracted an envelope, sealed with transparent tape. He explained that he had made a drawing twenty-four hours before, in the privacy of his own home, and then sealed it in the envelope, which he had kept in his jacket pocket. Geller had been able to reproduce a drawing under these conditions. "Now," he said to Randi, "let's see you do that!"

"And if I could do it, what would you say?" asked Randi.

"I would be very impressed. I'd be extremely impressed."

"But would you be impressed enough to say that I'm a psychic?"

"I don't know. I would have to consider that. But I would certainly say that you're a hell of a lot better magician than I think you are!"

"Wait a minute," Randi countered. "You say that Uri Geller is a psychic because he did this. Now, if I were able to do it, would you say I'm a psychic?"

"You do it, and I'll say that the Amazing Randi has amazed me."

Spraggett evaded the question and allowed Randi to hold the envelope between his hands for only ten seconds, as he had allowed Geller to do.

After the ten seconds, Randi asked for a pad and a felt-tip marker and made a drawing, allowing the camera a peek in order to show that he was really making the drawing at that time. When he was finished, he placed it face down on the table and asked: "Would you like to open the envelope, Alan?"

Spraggett did so and removed and unfolded a small sheet of blue paper, revealing a drawing of a tugboat with two decks, on the waves, with a single smokestack billowing smoke to the right.

"Am I a psychic if I've reproduced that, Alan? Yes or no?" asked Randi.

"If you've reproduced it, you're quite extraordinary."

"But I'm not a psychic?"

"You're extraordinary. I'd have to consider—"

Randi showed his drawing, identical in every respect to the one Spraggett had drawn twenty-four hours earlier.

The journalist turned pale again. His attempt at debunking Randi had backfired on him.

"Am I extraordinary, Alan?" Randi asked.

"That's . . . quite extraordinary, Randi."

"Have I proved anything to you?"

"Look, we have to take a break. . . ."

And when the break was over, Spraggett claimed he could easily figure out how Randi had done it, and in fact he would probably have the answer in an hour. However, he was never able to do it. Not in an hour, a day, or thirty-three years. And now, for the first time in print, here is the secret of that quite extraordinary trick.

"You say that Uri Geller is a psychic because he did this. Now, if I were able to do it, would you say I'm a psychic?" asked the Amazing Randi.

A Solution, at Last

When I first met Randi almost twenty years ago, one of the first things I asked him was how on earth he had been able to pull off that stunt on Spraggett's show. I had read about it and had seen the interview when it was shown on Italian television during a series on parapsychology by Piero Angela. I could not think of any trick used by magicians that could allow such an incredible feat. Learning how he had amazed Barbara Walters with the use of his "belly writer," as described in my previous column, only added to my confusion. For it was clear, by watching the tape, that he was not using any kind of hidden writer.

"Well, Massimo," he said, "I knew Spraggett quite well, and I was quite sure that he was not going to play by the rules. If he said he was not going to ask me to perform, I could quite confidently expect that he was going to play some tricks on me. Then, I had to be prepared."

Along with his assistant Moses, Randi went to Toronto, where the show was to be taped. Even though the taping was scheduled for 5 P.M., Randi showed up at the reception of the Global Television Network several hours earlier.

"But, sir," the guard had said, "you are expected to be here later this afternoon!"

"Of course, I knew that," Randi told me, "but I acted surprised. I asked the guard if he would personally tell Spraggett that I had been there but had gone away to get something to eat. The guard informed me that he would be done with his shift in about thirty minutes but he would leave a note behind for the next guard who took over. When he told me that, I asked if I could go down the hall to give my message in person to Spraggett. I left Moses behind to distract and chat with the guard while I went down the hall, but we didn't officially sign in at that time."

Thus, Randi got inside the building and found Spraggett's dressing room—Spraggett's name was on the door.

"I tried the door and found that it was open! I quickly went inside. I found a briefcase there. I opened it and found a couple of big spoons and an envelope."

As expected, the journalist had decided to play some dirty tricks on Randi. However, he could not imagine the trap he was putting himself in.

"I took the spoons and prepared one of them, then, I carefully peeled the tape from the envelope, opened it, and saw the drawing of the tugboat. I replaced everything as I found it, quickly left the dressing room, and closed the door."

All was ready, now Randi only needed to make it look as if he never had a chance to get close to the studio before the interview.

"I hurried back to the guard's desk and told him that Spraggett was inside the studio taping—which was quite true. I told him not to bother about leaving a note, and Moses and I headed for the car out in the parking lot."

They waited outside, and, very soon, they saw the replacement guard arriving—it was raining hard, so the guard didn't notice them—he went inside, and the other guard came out, got into his car, and drove away.

Randi and Moses waited until very late, then stood in the rain to get wet and made their entrance. "Of course, this guard had never seen us before, and we both signed in and gave the exact time of our arrival. In fact, we met Spraggett coming toward to reception desk as we went down the hall; he was coming to see if we'd arrived. He saw us all wet, which was a 'convincer' that we'd just arrived at that moment. From then on, it was just acting."

And quite good acting, I must say.

"When Spraggett first produced the spoons," said Randi, "I allowed my expression to change and tried to look dismayed. Spraggett's face had a big smile. He was satisfied that he had cornered me."

When his plan backfired on him, right after Randi did the drawing, Spraggett called for a commercial break, and, as soon as the camera was turned off, so was the artificial smile he had on his face.

"Spraggett left the set," Randi explained, "and went outside into the hall, where we heard much shouting. I looked at the control room, where Walter Gibson was in hysterics laughing. All of the people, including the engineers and cameramen, were giving me the 'thumbs-up' sign of approval. They really didn't like Spraggett at all."

Of course, as Randi usually did when he intended to prove his point (in this case, that a television reporter is no match for a good magician), he left a chance for his puzzle to be solved. There was at least one way to get a clue as to how Randi did it. Someone may have questioned the guard who had been on duty when Randi arrived in order to find out whether Randi had been at the studio before. If so, the guard could only have said no. However, had someone asked the morning-shift guard as well, Randi's trick might have been discovered. The fact is that no one ever questioned that guard.

If Spraggett never checked all of the possible trails, in order to find a solution to the mystery that had baffled him, one can be pretty sure that he never even bothered to look for alternatives to the paranormal "explanation" when he met Uri Geller. He didn't think he needed to; he had already decided that Geller was the real thing. How easy it must have been for Geller to fool Spraggett!

Not surprisingly, the show with Randi was not broadcast on the day that had previously been announced. It was delayed by a week, and, two weeks later, the station suddenly canceled the entire *ESPecial People* series. It seems that just one *special person* had been sufficient to knock ESP off of that network. □

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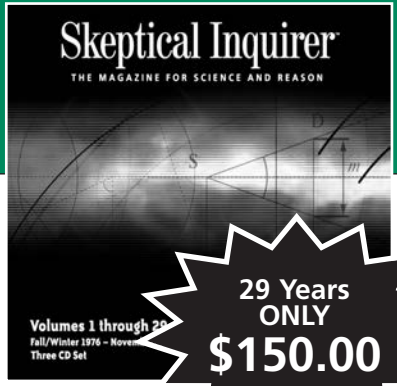

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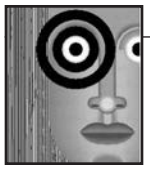


SKEPTICAL INQUIREE
BENJAMIN RADFORD

Measuring Near-Death Experience

Q: While researching near-death experience, I came across a so-called Greyson Scale, which is claimed to be "the strict medical criteria for assessing near-death experiences." But I couldn't find any further reference to such a scale. Is it a red herring?

—H. Pieterson

A: Near-death experiences (NDEs) are among the most difficult types of claims to investigate. Psychic detectives either can or can't reliably lead police to missing persons; Bigfoot either do or don't exist. These are testable claims. But if a person who has a brush with death reports seeing glowing figures, coming through a dark tunnel, and being in the presence of God, how does anyone—skeptic or believer—prove or refute that?

One of the first attempts to quantify the NDE was proposed by Raymond Moody, who listed fifteen aspects of the experience, including a dark tunnel, feelings of peace, meeting others (on the "other side"), and having a revised view of death afterward. This was useful as far as it went, but essentially a descriptive (instead of a scientific) analysis. Psychologist Kenneth Ring took up the effort in the late 1970s, developing a scale analyzing NDEs called Weighted Core Experience Index. The index described five basic features of NDEs.

Enter University of Virginia psychiatrist Bruce Greyson, who states that "The investigation of NDEs and their effects, however important, has been handicapped so far by the lack of accepted criteria for their occurrence and amplitude." Greyson criticized Ring's scale (noting, for example, that "the index was not based on statistical analysis and has never been tested for internal coherence or reliability") and developed his own Near-Death Experience Scale, published in the *Journal of Nervous and Mental Disease* (171: 369, 1983). Greyson's measurement is a thirty-three-item scaled response questionnaire submitted to subjects who claimed to have had NDEs and were members of the International Association for Near-Death Studies.

As Susan Blackmore describes in her book *Dying to Live*, Greyson's scale "consisted of sixteen questions grouped in four clusters. These four were concerned with emotions, cognition (or thinking), paranormal features, and transcendental aspects." Typical questions include, "Did scenes from your past come back to you?" "Did you feel a sense of harmony or unity with the universe?" and, "Did you seem to encounter a mystical being or presence?" Of course, a person might answer affirmatively to these and other questions without having been near death. Other questions, such as, "Did scenes from the future come to you? A) From the world's future; B) From personal future; or C) Neither" are also problematic and ambiguous (how would a person necessarily know if they had experienced something from the future?).

Among the surprising results, Blackmore notes, is that, while many people believe that the experience of going through a tunnel is one of the core elements of an NDE, Greyson found that the tunnel phenomenon was not significantly correlated with the NDE; "its presence does not help differentiate the depth of the NDE."

While research into near-death experience should not necessarily invoke paranormal or supernatural elements, it does attract those on the fringe. For example, one prominent NDE researcher is Richard Kohr, who links NDEs with his own interest in New Age topics and states that "the NDE group showed a significantly greater tendency to report psi or psi-related experiences such as general ESP . . . psychokinesis [moving objects with the mind], auras, apparitions, and out-of-body experiences." To a skeptic, this may simply indicate that the same people who have NDEs are also suggestible to a wide variety of phenomena. In his book *Heading Toward Omega*, Ring cites research done by Greyson and Kohr as suggesting that NDEs lead to "accelerated psychic development," including the ability to predict the future.

The Greyson Scale is rarely used or cited today, at least partly because there is little ongoing research on near-death experiences. Though it had a small sample size (N = 67) and real limitations, the study that developed Greyson's Scale is a legitimate effort at bringing rigor to a subject notoriously difficult to quantify.

References

Blackmore, Susan. 1993. *Dying to Live: Near-Death Experiences*. Amherst, New York: Prometheus Books.

Greyson, Bruce. (Ed.) 1984. *The Near-Death Experience: Problems, Prospects, Perspectives*. Springfield, Illinois: Charles C. Thomas.

Ring, Kenneth. 1984. *Heading Toward Omega: In Search of the Meaning of the Near-Death Experience*. New York: William Morrow and Company. □

Submissions can be sent to: **The Skeptical Inquiree, Skeptical Inquirer, P.O. Box 703, Amherst NY 14226-0703 (or bradford@centerforinquiry.net).**

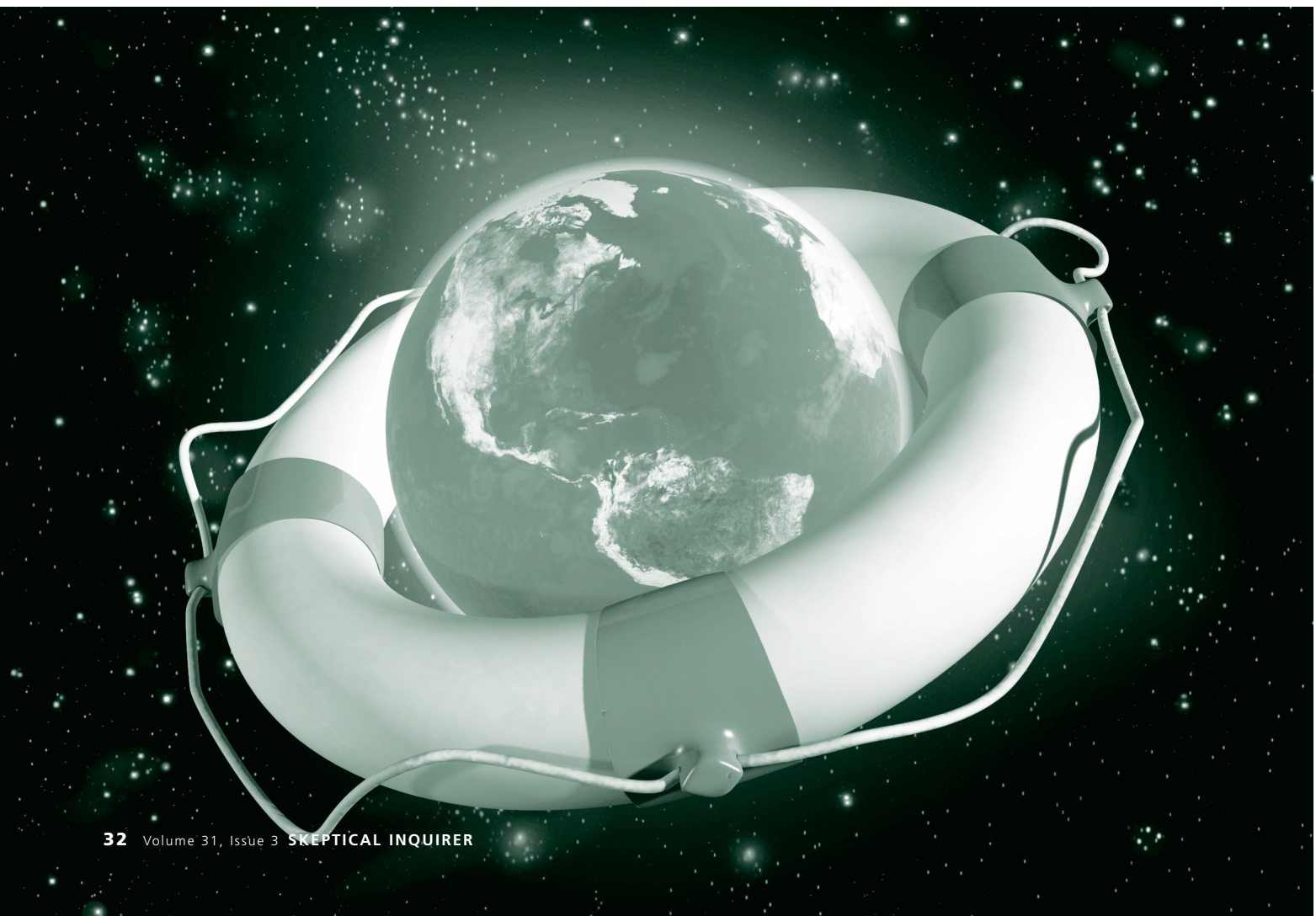
Benjamin Radford is managing editor of the SKEPTICAL INQUIRER; his first book, co-authored with Bob Bartholomew, was Hoaxes, Myths, and Manias: Why We Need Critical Thinking.

Global Climate Change Triggered by Global Warming

Part 1

The following article is the first half of a position paper on climate change and global warming issued by the Center for Inquiry's new Office of Public Policy in Washington. Much of the second half will appear in our next issue. The author of the position paper is Stuart D. Jordan, a senior staff scientist (emeritus) with the NASA Goddard Space Flight Center. The entire text is available on the CFI Web site at www.cfidc.org/opp/jordan.html.—Kendrick Frazier, Editor

STUART D. JORDAN



Executive Summary

This paper will offer compelling evidence from a large body of research that global climate change caused by global warming is already underway and requires our immediate attention. The research in question appears in refereed scientific literature, and most of it reflects a broad consensus of the worldwide climatology community. The principal points of this position paper are summarized below and are considered in detail, with supporting references, in the text that follows.

Convincing evidence that Earth's climate is undergoing significant, and in some cases alarming, changes has accumulated rapidly in recent years, especially during the past three decades.

The conclusion that there is significant warming of Earth's surface is not based primarily on theoretical models, although these models do succeed in replicating the existing database with growing success. Instead, global warming is a *fact* confirmed by an enormous body of observations from many different sources. Indeed, the focus of research has now shifted from attempts to establish the existence of global warming to efforts to determine its causes.

Although the exact extent of harm from global warming may be difficult to predict now, it can be said with confidence that the harmful effects of global warming on climate will significantly outweigh the possible benefits.

The probability is extremely high that human-generated greenhouse gases, with carbon dioxide as the major offender, are the primary cause of well-documented global warming and climate change today.

Much can be done *now* to mitigate the effects of global warming and the associated climate change. Difficulties in addressing the problem are not caused primarily by unavailable technology, but by the lack of sufficient incentives to implement the new technologies more aggressively.

After consideration of these points, the paper will end with a brief analysis of the role of the political process in addressing these issues. No detailed recommendations will be made, but some general suggestions will be offered. This final section will argue that any solution to this major global problem will require contributions from all major elements of our society, from the academic research community to American industry. Getting the science right is the critical first step, but implementation of solutions will need more broadly based cooperation that takes economic realities *and opportunities* into account. We will end this paper on that note, expressing the view that without a determined political effort, a successful attack on climate change is unlikely to happen soon.

Introduction

Convincing evidence that Earth's climate is undergoing significant—and in some cases alarming—changes has accumulated rapidly in recent years, especially during the past three decades.

Most climatologists regard the final decade of the twentieth century as the warmest in the past millennium (Albritton et al. 2001). Recently, there have been observations suggesting that 2005 may have been the warmest year on record. Rapid temperature increases in the Arctic have already produced a significant reduction in Arctic sea ice (Fisher et al. 2006). Reduced sea ice decreases the reflection and increases the absorption of sunlight in the Arctic, an almost "runaway" process that further amplifies global warming. Recent research has demonstrated that the Earth's energy budget is out of balance, with more energy captured from the sun than is currently radiated back to space (Hansen et al. 2005). This makes global warming inevitable. This is not due to any measurable increase in the incoming solar energy, but to an increase in the amount of that energy captured and retained by Earth.

Glaciers are melting rapidly (Albritton et al. 2001), and the net loss of ice to seawater from Greenland (Chen, Wilson, and Tapley, 2006; Dowdeswell 2006) and, more recently, from Antarctica (Alley et al. 2005; Hodgson et al. 2006; Overpeck et al. 2006) is alarming. Measured increases in sub-ice-sheet meltwater are lubricating and accelerating the flow of this ice into the oceans. Not only does this promote mean (average) sea level rise, which has already begun, it could eventually modify current patterns of global ocean circulation, an important regulator of climate. The oceans are also a major sink for removing carbon dioxide from the atmosphere (Sarmiento and Wofsy 1999). Because the atmospheric concentration of carbon dioxide continues to increase, a long-established equilibrium seems to have been compromised, and there is evidence that this absorption process is starting to saturate (McAvaney et al. 2001).

The effects of these major changes in the oceans, which we know have occurred in previous paleoclimates, would be catastrophic if a significant fraction of the Greenland ice sheet or, far worse, the Antarctic ice sheet were to melt. A simple calculation shows that the frozen water in the Greenland ice sheet alone would, if melted, raise the global sea level by about seven meters (about twenty-two feet). This rise would be independent of the effect of higher temperatures on warming the oceans' surface waters, which, by decreasing their density, would raise the sea level still higher, as has already begun.

While major changes in the oceans could well be the most alarming consequence of global warming for our civilization, many other known harmful effects are well documented. Some of these will be reviewed briefly below in our evaluation of the costs and possible benefits of global warming.

* * * * *

The conclusion that there is significant warming of Earth's surface is not based primarily on theoretical models, although these

Stuart D. Jordan is a physicist and astrophysicist at NASA's Goddard Space Flight Center, where he has worked since 1968. His specialty is solar and stellar atmospheres, including, more recently, investigating the sun-climate connection. He is a Rhodes scholar and has published scores of papers in refereed scientific journals. Address: NASA/GSFC, Code 612.1, Solar Physics Branch, Greenbelt, MD 20771. E-mail: Stuart.D.Jordan@nasa.gov.

models do increasingly succeed in replicating the existing database. Instead, global warming is a *fact* confirmed by an enormous body of observations from many different sources. Indeed, the focus of research has now shifted from attempts to establish the existence of global warming to efforts to assess its causes.

There remains a small number of scientists who claim that the current warming trend may not reflect primarily human activity. We consider their arguments in this paper. In addition, some errors in analysis may have been made by colleagues whose position favors anthropogenic (human-caused) activity

There remains a small number of scientists who claim that the current warming trend may not reflect primarily human activity.

driving the changes. The work of these critics is useful, and reflects the way science proceeds and should proceed. However, even these critics no longer deny the reality of global warming and the currently accelerating climate change.

Given many serious consequences certain to follow from increased climate change, we are naturally led to ask three questions relevant to any policy initiatives formulated to address global warming:

1. What are the trade-offs between possible benefits claimed for global warming compared to the known harmful effects?
2. What are the most likely causes of the current rapid rise in the mean global surface temperature?
3. What can be done to mitigate global warming and the climate change that results?

These questions will be addressed in the following three sections of this paper.

Possible Benefits Versus Known Harmful Effects

Some of those reluctant to initiate programs to address the harmful effects of climate change frequently point out that there may also be benefits from global warming. Since some dislocation of current activities would be inevitable under any major program for change, these possible benefits should be examined and compared to the harmful effects of failing to initiate effective palliative measures. In effect, a rough benefit-to-cost assessment becomes important whenever investment of resources is involved, as is certainly the case here.

Agriculture at Higher Latitudes

The most commonly cited benefit of global warming is the longer growing season that higher-latitude regions of North America and Asia would enjoy. That warmer temperatures are moving northward in the Northern Hemisphere has been well documented. However, only if rainfall and other conditions conducive to successful agriculture also march north in tandem with temperature is this scenario likely to be realized. This is currently unknown. While several current general circulation models (GCMs) of global climate all agree that global warming will induce different changes in different geographical regions, further work is needed before they can predict with confidence the details of regional changes. We already have two historically recent examples that demonstrate the fragility of allegedly rich lands awaiting development. One is the American Rocky Mountain West, constantly threatened with water shortages and clearly incapable of supporting a large population (in spite of much nineteenth-century hype to the contrary). The other is former Soviet Premier Nikita Khrushchev's "virgin lands" program for transforming central Asia into a vast breadbasket. The effort was largely a failure. In addition, a major dislocation of ecosystems can be expected as new plants and animals move into new regions and out of others. While we cannot say the end result of this process will always be harmful on balance, we can say that the ecosystems involved will all be stressed during these changes, especially if the changes are rapid. From the point of view of ecosystem health, rapid change is extremely unlikely to be beneficial.

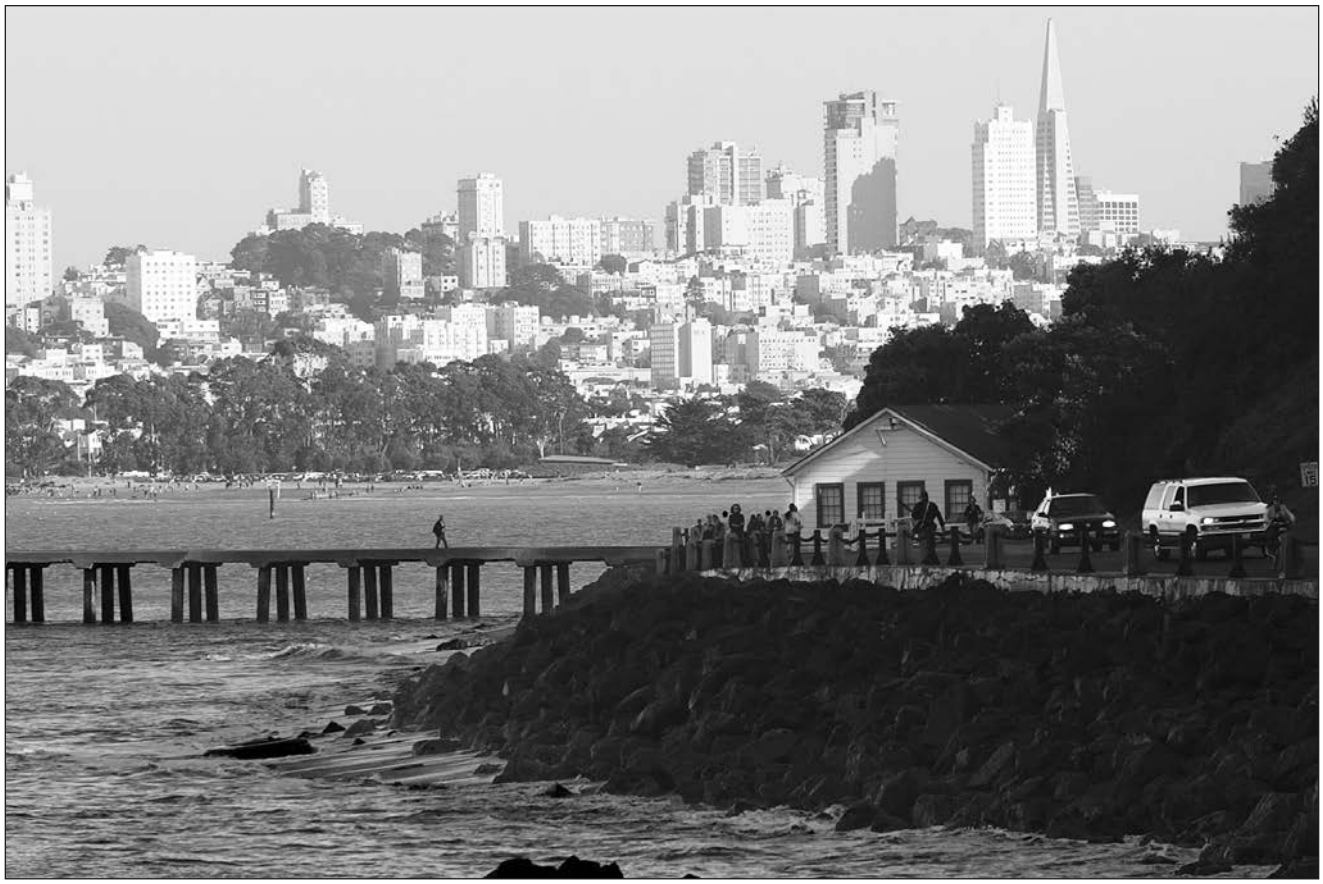
Increases in the Rate of Plant Growth

The other benefit that is often claimed for global warming is that plants will grow more rapidly. It is further noted that a more rapid rate of plant growth, combined with a higher carbon dioxide concentration in the atmosphere, will partially offset these higher concentrations by removing more of this gas through accelerated photosynthesis. However, these possible benefits must be weighed against other possible effects of accelerated plant growth in currently fallow regions, assuming that local soil and moisture conditions already noted might allow it. This would surely lead to ever-larger human populations in potentially fragile areas, an impact hard to predict but not likely to be beneficial. There is even recent evidence that, while increasing the carbon dioxide concentration of the atmosphere appears to accelerate initial plant growth, the increased growth rate will taper off rather quickly. From these considerations, it is not obvious that there would be any net benefit at all.

* * * * *

Destructive Effects of Rising Sea Level

Against these possible but still questionable benefits, we need to examine the harmful effects of the climate change that results from global warming. No one denies there will be problems, of which the most dramatic may be the rise in the mean sea level already discussed. For those living in the Washington, D.C., area, it is sobering to visit the museum of the National



The waters of the bay lap against the shoreline of San Francisco, California, January 20, 2007. Global-warming researchers say the sea level at the Golden Gate has risen over seven inches in the past century due to glacial melting and thermal expansion. [Photo via Newscom]

Academy of Sciences. A hands-on exhibit reveals how much of coastal Maryland will be flooded by the Chesapeake Bay if the mean sea level rises by 0.5 meters, by 1.0 meter, and by 1.5 meters. A rise of 0.5 meters is approximately 1.6 feet. For reference, the measured rise in the mean global sea level that has already occurred in the twentieth century is on the order of half a foot (Church et al. 2001). Since surface ocean water at current temperatures expands when the water temperature rises, global warming makes some coastal flooding inevitable, with potentially dire consequences for many highly populated areas located near sea level. Melting of glaciers and icecaps further accelerates the process.

Beyond these effects that are already taking place lies the risk of catastrophic sea level rise that substantial melting of the Greenland and Antarctic ice sheets would inevitably produce. To a complete melting of the Greenland ice sheets, leading to a sea level rise of approximately twenty-two feet, a complete melting of Antarctic ice would add an additional rise of almost 200 feet (Church et al. 2001). No one predicts that human-driven global warming will produce a complete loss of the Antarctic sea ice in the foreseeable future. Nevertheless, it is sobering to recall that, to the already noted accelerating melt of the Greenland ice sheet, recent evidence shows that snowfall in the interior of Antarctica, formerly cited to compensate for ice-sheet loss from coastal regions there, is *not* increasing (Monaghan et al. 2006). The significant losses from coastal Antarctic ice sheets means there is a net transfer of ice into sea water at high southern latitudes as well (Cook et al. 2005). Even a partial loss of Antarctic ice will result in a significant rise in sea level, with resulting inundation of coastal regions.

The Specter of Catastrophic Climate Change

There is another potentially catastrophic problem that could result from the impact of global warming on the world's oceans. This is a possible change in the global oceanic conveyor belt, which governs the many surface currents and coupled deep-water flows that are known to have important impacts on major regional climates. The best known and best studied of these is the Gulf Stream, which plays an important role in maintaining temperate conditions in northern Europe. Not all climate scientists agree on how much, if any, reduction in Gulf Stream flow has already begun, or on how important this warm current is to maintaining temperate conditions in northern Europe (Hátán et al. 2005; Kerr 2005; Seager 2006). However, some reduction of this flow—called the thermohaline circulation from the driving force—is inevitable if enough less-salty, lower-density, meltwater is introduced into the North Atlantic. This is exactly what would result from rapid melting of the Greenland ice sheet, supplemented by further melting of the Arctic sea ice. It is also universally accepted that some cooling in northern Europe would then become inevitable (Stocker et al. 2001).

One Example of Catastrophic Climate Change

What makes the well-studied period known as the "Younger Dryas" so disturbing is what it tells us about a sudden, devastating cold period that occurred *after* Earth began to emerge from the last Ice Age. The Younger Dryas is a period of approximately one thousand years duration, centered around 12,000 B.C. During the inception of the Younger Dryas, the mean global surface temperature—known from sea-core sediments taken from many ocean basins around the globe—dropped over ten degrees C in a few decades. Furthermore, while the geological evidence is still under investigation, a large-scale picture of the Younger Dryas is emerging. As the Laurentian Ice Sheet that formerly covered much of North America was receding, a huge freshwater lake, Lake Agassiz, formed west of what is today Lake Superior. As long as the frigid waters of this lake drained through the current Mississippi Valley into the Gulf of Mexico, the situation was stable. Then, rather abruptly, geological processes in southern Canada appear to have blocked this southern outlet, releasing an enormous flow of cold water through the St. Lawrence Valley into the North Atlantic (Broecker 2006). The effect on suppressing the thermohaline-driven circulation of the global oceanic conveyor belt was sufficiently strong to plunge much of Earth into a new period of drastically colder temperatures for about one millennium. A detailed account of the Younger Dryas, and of how ice-core data and other data can be used to confirm this picture, as well as other climate changes that have occurred since Earth emerged from the last major ice age, is presented with reference to many original sources in the National Academy of Sciences book *Climate Crash* (Cox 2005).

Climate as a Semichaotic System Susceptible to Significant Shifts

We cannot assert that the Younger Dryas scenario would necessarily be repeated if global warming causes much of the Greenland ice sheet to melt. There are too many other factors that would need to be considered. One such factor is the rate of melting, since the release of cold water from Lake Agassiz was apparently quite precipitous. However, the Younger Dryas does tell us that dramatic climate change can occur very quickly if some large-scale process triggers a dramatic shift in a parameter the climate depends upon, pushing the climatic system beyond a critical point for stability. Climate is a highly nonlinear, semichaotic system. These systems can respond in hard-to-predict ways to a number of triggering processes that, under critical conditions, dramatically shift them from one equilibrium state to another, a property that mathematicians have already demonstrated in complex nonlinear systems. While this is a highly technical point, it is an extremely important one to grasp for understanding large-scale climate processes. A good description for an intelligent layperson can be found in *Climate Crash*.

The trigger for the Younger Dryas was the eruption of a massive cold water flow into the North Atlantic. A climate crash sharing many common features with the Younger Dryas has occurred even more recently during the allegedly stable Holocene, around 8200 B.C. (Ellison, Chapman, and Hall 2006). The evidence for this more recent event was obtained from sea bottom sediments that, thanks to new techniques, now offer promise of providing further confirmation of their global character back through the most recent ice age (Nicholson, et al. 2006). The next triggering event could be different. It is difficult to predict if persistent increases in carbon dioxide and other greenhouse gases might induce a sudden major climate shift in the foreseeable future. While the probability would seem to be small today, no one can rule out such a future change with certainty. On timescales relevant to shifts in global equilibria, the rate of change of the mean global surface temperature over the past three decades is sobering.

Less Obvious Harmful Effects of Climate Change

If we assume that the climate system is sufficiently stable so that no Younger Dryas catastrophe awaits us before corrective measures can be taken, there are still many less harmful effects we can expect that are already underway as a result of global warming. Consider the effect

of a modest sea level rise on migrating insectivorous songbirds returning to the United States from tropical America in the spring. Having lost roughly half of their body weight flying over water, these birds are critically dependent on food sources in low-lying coastal regions along the northern Gulf of Mexico. If the swampy areas of southern Louisiana alone were flooded by sea water, the reduction in the population of these birds could be drastic. Agricultural experts estimate that the insects eaten by these birds save American agriculture billions of dollars annually. Addressing bird migration raises an even subtler issue. Advocates of wind power to address global warming are often criticized because large windmills kill birds and bats. However, windmills can be defended to bird lovers by considering the net effect on birds and bats of rising sea levels. The number of migrating birds who perish from this new energy technology may be small compared to the number who will perish from starvation in migration, if these southern coastal areas are flooded by sea-level rise. Of course, there are many other often-overlooked examples of economic hardships associated with sea-level rise. Recently, managers of several American insurance companies announced that they may no longer insure low-lying coastal properties, citing not Hurricane Katrina but instead rising sea level.

Many of the deleterious effects of global warming on climate are not immediately obvious. Others include the increase in pathogens in densely populated mid-latitude regions; documented evidence that storms are likely to become more violent (Emanuel 2006; Mann and Emanuel 2006); increasing severity of forest fires (Westerling et al. 2006); the further amplification of global warming from a decrease in Earth's reflection of sunlight resulting from lesser ice and snow cover, especially in the Arctic; and many more subtle effects.

Global warming is inducing instabilities in the Earth's climate that we already know have many harmful effects. What we do not know yet is *how* serious the situation might become. The possibilities range from bad and costly to fix—such as saving many valuable coastal areas from flooding and fighting new and more pervasive diseases—to the much less probable but potentially catastrophic effects of a sudden, significant climate shift that could be difficult to reverse.

Although the exact extent of harm from global warming may be difficult to predict now, it can be said with confidence that the harmful effects of global warming on climate will significantly outweigh the possible benefits.

However, we have yet to address the critical question of what is primarily responsible for the current warming trend. Is it our own anthropogenic activity? Or is it instead, as some have claimed, natural fluctuations that we are helpless to influence and therefore must simply stoically accept and ride out?

Likely Causes of the Current Rapid Rise in Global Surface Temperature

Showing that the effects of global warming and climate change are likely to be far more harmful than beneficial is only the first step we must take toward a solution. The question of the causes must now be addressed. Only if the causes can be addressed by determined action on our part is there any hope of mitigating or eliminating the harmful effects. Consequently, we need to examine climate fluctuations due to natural processes over which we may have no control. These have been proposed as the primary drivers of the current rapid global temperature rise. This section examines the arguments for these natural processes, and also for the human (anthropogenic) activities that many scientists believe are the primary causes.

Although the exact extent of harm from global warming may be difficult to predict now, it can be said with confidence that the harmful effects of global warming on climate will significantly outweigh the possible benefits.

Two Important Definitions

It is useful to introduce precise definitions of two terms that appear throughout this paper. The *mean global surface temperature* is defined as the average of the air temperature measured at the land surface and of the surface water temperature measured over large bodies of water, statistically weighted by the fact that more measurements are available in some equal-area grid "points" than in others. Since the advent of the space age, these temperatures can now be uniformly measured from satellite instruments over the entire globe. By comparing the results of the more recent space observations with current measurements made in a more traditional way from the ground, or from ships and anchored sensors on the oceans, it has been possible to determine the accuracy of earlier ground-based and sea-based observations, which proved to be surprisingly good in most cases.

The other term we use frequently here is *climate*. Most people realize that climate and weather differ mainly in the timescales involved. The timescale for climate used by many contemporary climatologists is of the order of thirty years, while weather is a daily phenomenon that we know can change abruptly within hours. The recent advent of paleoclimatology based on deep ice-core studies has somewhat shaken the idea of gradual climate change. As discussed above, we now know that Earth's global climate can become rapidly unstable under certain conditions. Indeed, changes of over ten degrees C in one or two decades have occurred *many times* over the past 400,000 years (Folland et al. 2001). This has now been extended to 600,000 years and is discussed further in the just-released IPCC-2006 Science Report. It is only somewhat reassuring that ice-core studies suggest that the global climate system has probably been more stable over the past 10,000 years (the

Holocene) than at any time over the 600,000–year record. Yet even during this relatively stable Holocene epoch, there is evidence that regional climate change was an important factor in the rise and fall of several early historical civilizations (Cox 2005). Perhaps the best way to define *global climate* is the average of the global weather, averaged over a time interval appropriate to the rate at which the climate is changing. That is the viewpoint we have adopted in this paper, using a definition of an inherently dynamic phenomenon that emphasizes our primary concern, which is *climate change*.

With this background we now examine the question of what is likely to be mainly responsible for the current rapid rise in the mean global surface temperature. We begin by discussing what is almost certainly *not* causing it.

Might the Sun Be Driving Global Warming?

We noted earlier that the sun is not responsible for the current rapid global temperature rise. (We emphasize here that these remarks refer to the last several decades. The role of the sun over longer epochs remains an area of active research.) Three hypotheses have been advanced for solar driving of the current rapid temperature rise. One speculates that there is a small but persistent rise in the solar flux at the minimum phase of solar sunspot activity, when the small periodic increase in flux due to this activity is absent. So far, measurements from space lack the accuracy to establish the precise value, but they do put an upper limit on any possible increase, which is far too small to explain the observed terrestrial temperature rise. In addition, there are other solar observers who infer from other sensitive data that there is no secular increase in this flux at all, over the last three decades of measurements (Hudson 2004).

A second solar hypothesis is that the tiny energy increase in the ultraviolet radiation at the peak of the sunspot cycle produces enough change in the upper layers of Earth's atmosphere that, properly coupled through planetary waves with the weather-producing lower layers, it will exert a sufficient effect on the lower atmosphere (the troposphere) to produce cyclic and increasing global warming. This hypothesis demands that there be a significant and persistent increase in the level of solar activity, hence ultraviolet radiation, over recent solar cycles, and that a strong periodic signature of the solar cycle be seen in this process. Neither has been observed (North, Wu, and Stevens 2004), nor is there any evidence to date for a coupling mechanism nearly strong enough to support this view.

The final hypothesis involves the modulation of intergalactic cosmic rays by the solar-cycle-dependent interplanetary magnetic field. Reductions in this magnetic field during the minimum of solar activity increases cosmic-ray penetration into Earth's atmosphere. It was postulated that, during this period of increased cosmic ray penetration, cloud formation would be enhanced through the "cloud chamber" effect well known to physicists in the high-energy laboratory. An early, surprisingly high positive correlation of increased cloud formation with enhanced cosmic-ray flux stimulated interest in this possibility, but further work with a more extensive database has negated it. This was not surprising, given a large number of other problems with this hypothesis too technical to review here.

In summary, there is no evidence that the sun is responsible for current global warming, and a great deal of evidence to suggest otherwise. Solar forcing of the current global warming is extremely unlikely (Ramaswamy et al. 2001).

Internal Modes of the Climate System

Another possibility that has been tentatively proposed is that some long-term quasi-periodic process confined to Earth itself is responsible. To date, no one has provided a plausible, testable mechanism for such Earth-bound forcing. While there is speculation that a very large-scale phenomenon such as the El Niño Southern Oscillation (ENSO) might play a role in quasi-periodic global warming and climate change, there is no convincing evidence to support this. In the assessment of the IPCC-2001 Science Report, the likelihood that internal modes of the climate system are causing global warming and influencing the current climate change range from unlikely to extremely unlikely (Stocker et al. 2001).

The 'Urban Heat-Island' Effect

S. Fred Singer has suggested that the urban heat-island effect may be responsible for global warming (Singer 2002). Because large urban areas are warmer by several degrees than their surroundings, Singer suggests that, when these effects are averaged into a computation of the global temperature, with proper allowance for the higher density of records in the urban areas, the increase in the global temperature can be explained. This is not correct. The work of a number of scientists that has appeared in the refereed literature and which takes into account the relative density of observing stations shows that, while the urban heat-island effect is indeed large in major urban centers, its effect on the mean global surface temperature is almost negligible (Folland et al. 2001).

Are Climate Scientists Biased toward Anthropogenic Forcing?

In contrast to the legitimate research that raised the possibility that either the sun or internal modes of the climate system might be responsible for global warming and climate change, there is a final suggestion one occasionally hears that reflects a serious ignorance of how science proceeds. This is the speculation that the work of the great majority of climate scientists who support anthropogenic forcing of global warming and climate change is motivated primarily by a desire to get more support for their research. Thus, it is further suggested, they are introducing a strong bias into the way they report their results.

In reply to this, it is worth noting that, aside from proving a new hypothesis, there is nothing that will enhance a scientist's reputation more than disproving one that has gained some notoriety. Generally speaking, the better the scientist, the more likely personal pride will motivate him or her to proceed within the "rules." The idea that there is an unwritten self-serving understanding among climate scientists to falsely

exaggerate the implications of their work for financial gain reflects widespread ignorance of how science proceeds.

Earth's Orbital Dynamics

While the Milankovich effect, named after its proponent, is now regarded as the likely cause of the ice ages, these changes in the eccentricity of Earth's orbit around the sun and in Earth's spin-axis orientation occur over far too long a duration to explain the relatively rapid global warming now occurring (Morell 2004). Also, since we know that the next major changes due to these processes will be to enter a new cold period, the present trends are of the wrong kind to be explained by Earth's dynamics. To date, no convincing case can be made that global warming is caused by natural processes over which we may have no control in the foreseeable future.

To be continued in the July/August 2007 SKEPTICAL INQUIRER.

Acknowledgments

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A Position Paper from the Center for Inquiry Office of Public Policy, Washington, D.C. Reviewing Committee: Paul Kurtz, Ph.D., Thomas W. Flynn, Ronald A. Lindsay, J.D., Ph.D., Toni Van Pelt.—December 2006

References

Comments on the references: Most of the references are to summary articles found in major, and easily accessible, refereed sources. Those wishing to track the material to the original papers will find those papers referenced in the ones that appear here. The latter papers number literally in the thousands. An effort has also been made to refer to the most recent work, as climate science is a rapidly moving field. The main thrust of this paper is educational, ending with a few suggestions that have been advanced by many others. The need for a further understanding of the main issues among policy makers today is evident from some of the misleading, or even erroneous, ideas occasionally advanced by advocates of the status quo, which does *not* mean that scientific criticism of the ideas proposed by the advocates of action is a bad thing. Only by considering the results of all the work in the refereed literature will we arrive at the best policies, noting that the emphasis is on the work that has passed the muster of the scientific peer-review process. That is what we are trying to summarize in this paper.

Albritton, D.L., et al. 2001. Technical summary. In *Climate Change 2001: The Scientific Basis.* New York: Cambridge University Press.

Alley, R.B., et al. 2005. Ice sheet and sea-level changes. *Science* 310:456.

Broecker, W. 2006. Was the Younger Dryas Triggered by a Flood? *Science* 312:1147.

Chen, J.L., C.R. Wilson, and B.D. Tapley. 2006. Satellite Gravity Measurements Confirm Accelerated Melting of Greenland Ice Sheet. *Science* 313:1958.

Church, J.A., et al. 2001. Changes in Sea Level. In *Climate Change 2001: The Scientific Basis.* New York: Cambridge University Press.

Cook, A.J., et al. 2005. Retreating Glacier Fronts on the Antarctic Peninsula over the Past Half-Century. *Science* 308:541.

Cox, J.D. 2005. *Climate Crash.* Washington, D.C.: Joseph Henry Press.

Dowdeswell, J.A. 2006. The Greenland Ice Sheet and Global Sea Level Rise. *Science* 311:963.

Ellison, C.R.W., M.R. Chapman and I.R. Hall. 2006. Surface and Deep Ocean Interactions during the Cold Climate Event 8200 Years Ago. *Science* 312:1929.

Emanuel, K. 2006. Hurricanes: Tempests in a Greenhouse. *Physics Today.* August: 74.

Fisher, D., et al. 2006. Natural Variability of Arctic Sea Ice over the Holocene. *EOS* (Transactions of the American Geophysical Union) 87(28):273.

Folland, C.K., and T.R. Karl. 2001. Observed Climate Variability and Change. In *Climate Change 2001, The Scientific Basis.* New York: Cambridge University Press. (See especially boxed summary, p.106).

Hansen, J., et al. 2005. Earth's Energy Imbalance: Confirmation and Implications. *Science* 308:1431.

Hátán, H., et al. 2005. Influence of the Atlantic Subpolar Gyre on the Thermohaline Circulation. *Science* 309:1841.

Hodgson, D.A., et al. 2006. Examining Holocene Stability of Antarctic Peninsula Ice Sheets. *EOS* 87(31):305.

Hudson, H. 2004. Solar Energy Flux Variations. In *Solar Variability and Its Effect on Climate Change*, eds. J. Pap, and P. Fox, American Geophysical Union Monograph #141.

Kerr, R.A. 2005. Confronting the Bogeyman of the Climate System. *Science* 310:432.

MacAvaney, B.J., et al. 2001. Model Evaluation. In *Climate Change 2001: The Scientific Basis.* New York: Cambridge University Press.

Mann, E., and K. Emanuel. 2006. Atlantic Hurricane Trends Linked to Climate Change. *EOS* 87(24):233.

Monaghan, A.J., et al. 2006. Insignificant Changes in Arctic Snowfall since the International Geophysical Year. *Science* 313:827.

Morell, V. 2004. Now What? *National Geographic* September: 56. (See especially the excellent illustrated description of the Milankovich effect on climate, p. 64.)

Nicholson, C. et al. 2006. Santa Barbara Basin study extends global climate record. *EOS* 87(21):205.

North, G.R., Q. Wu, and M.J. Stevens. 2004. Detecting the 11-year solar Cycle in the surface temperature field. In *Solar Variability and Its Effect on Climate Change,* eds. J. Pap, and P. Fox, American Geophysical Union Monograph #141.

Overpeck, J.T., et al. 2006. Paleoclimatic evidence for future ice-sheet instability and tapid sea-level rise. *Science* 311:1747.

Ramaswamy, V., et al. 2001. Radiative forcing of climate change. In *Climate Change 2001, The Scientific Basis.* New York: Cambridge University Press.

Sarmiento, J.L., and S.C. Wofsy. 1999. A U.S. Carbon Cycle Science Plan, prepared at the request of the U.S. Global Change Research Program.

Seager, R. 2006. The source of Europe's mild climate. *American Scientist* 94:334.

Singer, S.F. 2002. *The Kyoto Protocol Is Not Backed by Science.* Arlington, Va.: The Science and Environmental Policy Project. (See especially discussion of the urban heat-island effect, p. 10.)

Stocker, T.F., et al. 2001. Physical climate processes and feedbacks. In *Climate Change 2001, The Scientific Basis.* New York: Cambridge University Press.

Westerling, A.L., et al. 2006. Warming and earlier spring increase western forest wildfire activity. *Science* 313: 940. □

To date, no convincing case can be made that global warming is caused by natural processes over which we may have no control in the foreseeable future.

Danger! Scientific Inquiry Hazard

A physicist presents an overview and clarification of affronts to science and creates a whimsical hazard symbol to further describe them. Maybe this will help people understand scientific affronts and use them in developing a healthy perspective of the world around them.

ALAN J. SCOTT

Hazard symbols are commonplace and permit people to function more knowledgeably, safely, and efficiently. Three such symbols are shown in figure 1. They supply us with important information. The world needs a hazard symbol for scientific affronts—these things that impede progress towards a true understanding and appreciation of the physical world. Keeping with the spirit of the fire diamond, it should be simple, provide immediate feedback about exposure hazards, and subdivide affronts into specific classifications. It also needs a universally recognized symbol that represents the degree of hazard. Enter the Scientific Affronts Hazard Symbol (figure 2).

Figure 1: Radioactive, biological, and chemical (NFPA fire diamond) hazard symbols

The basic structure of this symbol is a collection of four triangles. Three of the triangles contain numbers, and the center one has a smiley-face icon. The smiley, though cheesy, has no close competitors for universal recognition and immediate, intuitive understanding. The loop structures behind the smiley represent the atom. The single most important piece of factual knowledge in all of science, according to Richard Feynman, is the atomic theory of matter (Feynman 1963).

Each triangle represents a macroscopic division of scientific affronts. The number in the triangle represents a level of hazard. This requires an internationally accepted standard by which measures can be compared and calibrated. Failing to find such standards at NIST (National Institute of Standards and Technology), let's present the following as international standards.

Baseline Standards

A zero in the top triangle (gray in the colored version) indicates a philosophy or worldview closely aligned with science. A number four here represents a philosophy far removed from science. A zero rating would reflect, or at least not contradict, the understanding that nature is comprehensible. Science is the identification of reoccurring patterns in nature, and these patterns make nature comprehensible and predictable. These patterns are called testable laws and theories (APS 1999). A zero in the top triangle represents a sound understanding of nature; for example, that all matter is composed of atoms or parts of atoms, the universe is old and extremely vast, simple organisms can evolve into more complex organisms, and so on. These principles follow those enumerated by Chet Raymo in the *American Journal of Physics* (Raymo 1998).

If two or more theories (or hypotheses) are presented to describe the same observation(s), then an algorithm is needed to help rate each theory. Carl Sagan's book *The Demon-Haunted World* (Sagan 1996) along with Theodore Schick and Lewis Vaughn's book *How to Think about Weird Things* (Schick and Vaughn 1999) are useful references for rating competing hypotheses.

The lower left triangle represents conflicts of interests. What better color to have it be than the color of money? A zero represents a topic or philosophy solely shaped by the interest to pursue absolute truths in nature (Schick and Vaughn 1999). There is no human pursuit of financial gain or prestige associated with a topic or philosophy. As Richard Dawkins suggests, good science philosophy is being an *advocate for disinterested truth* (Dawkins 2003).

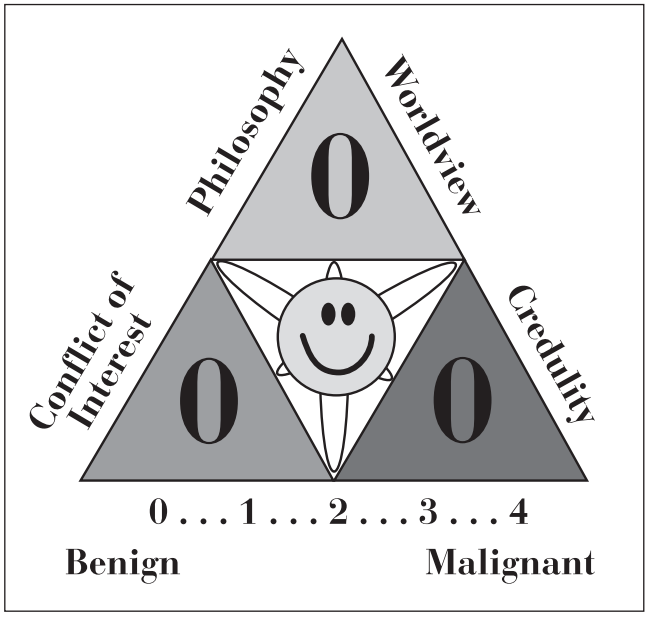

Figure 2: Scientific Affronts Hazard Symbol

The lower-right triangle (purple in color) is about credulity—the willingness to believe in something untrue or unsubstantiated. A zero in this triangle represents substantiated claims. It represents a recognition and belief in theories that have supporting evidence.

I propose the following system for choosing an appropriate smiley for the center of the symbol. The complete set of smileys to choose from is shown in figure 3. Smileys *a* and *b* are to be used only in association with ratings that get all zeros or ones. A labeling of all zeros must get a smiling face. Any rating of two or higher in triangles must get either a *c* or *d* face. A rating of four in any triangle must get a grimacing face.

Alan Scott is a professor of physics at the University of Wisconsin-Stout in Menomonie, Wisconsin, 54751. E-mail: Scotta@uwstout.edu. He is the author of the book Addicted to Placebos: Understanding Science and Society *(Lulu, Inc. publisher, www.lulu.com). He received his PhD in 1995 from Kent State University in experimental nuclear physics.*

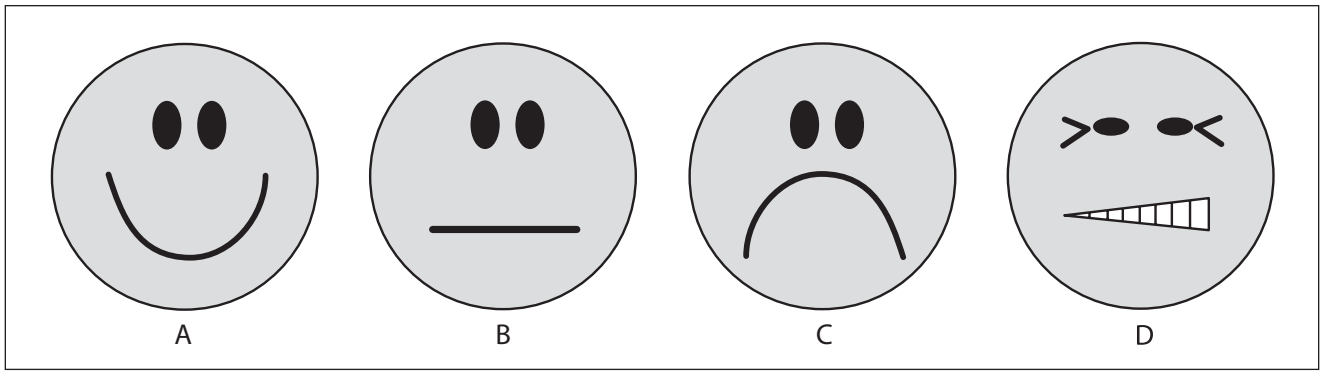

Figure 3: Smiley A is smiling, B is neutral, C is frowning, and D is grimacing in disgust.

When two or more people debate the appropriate weightings for a topic or philosophy, we should consider a difference of one unit to be inconsequential. Therefore, continued debate on the issue will be marginally productive. Any ratings with differences of two or more should be debated and resolved.

Scientific Affronts

Common affronts to science include pseudoscience, relativism, romanticism, antiscience, secrecy, deceptive consumer marketing, and religion. These categories are not mutually exclusive, nor are they completely devoid of being beneficial to humanity. For instance, Pakistan's nuclear scientists should have exercised secrecy rather than selling their blueprints of nuclear weapons (Pennington 2003; Lancaster 2004).

Let's look at this symbol being applied to common affronts to science.

Pseudoscience

Pseudoscience is by definition false science. It usually describes some topic that uses scientific terms and descriptions but fails to appropriately weigh evidence and present unbiased, well-informed, objective conclusions. It is a topic that is cloaked in the look and feel of science but is not science.

Consider the field of acupuncture. A Web site promoting the health benefits of acupuncture, www.letusreason.org, states that:

> The technique is used to unblock and redirect energy flow through the insertion of needles—Acupuncture, or use of pressure—acupressure, at key points on the body to balance the energies many of the places the needles are inserted have no nerve endings. It is based on the occultic system of Taoism often called Yin/Yang, Chi or Ki. A common force that flows through the universe.

Supposedly, sticking needles into a specific location on the body can help alleviate specific health problems. Acupuncture has been found to lower blood pressure (Sampson 2002), but this effect happened when acupuncture needles were stuck in places that were not supposed to affect the heart. Feng shui is a close cousin to acupuncture, and its principles suggest that financial, spiritual, and personal harmony can be obtained by properly arranging inanimate objects such as chairs, mirrors, etc. Of course, physical surroundings can affect one's psychology; president Lyndon Johnson required that his chair be higher than any others on Air Force One when having a meeting (Schnall 2001). But feng shui insists that people can sense a cluttered cabinet without looking into it. A careful and simple experiment can provide strong evidence that such a notion is utter nonsense. For this reason and many others (Carroll 2002), feng shui should be labeled as pseudoscience.

Relativism

Relativism is the philosophical belief that absolute truths don't exist or at least are not accessible to human experience. Adherents to this philosophy argue that science is just a culture with its own norms and language. Those embracing relativism consider truth to be relative: if someone believes something to be true, then that makes it true for that person.

Science enriches our lives with its ability to provide glimpses into knowledge that is independent of time, space, or cultures. Steven Weinberg declares that "The effort to understand the universe is one of the very few things that lifts human life a little above the level of farce, and gives it some of the grace of tragedy" (Weinberg 1977; DeWitt 2005).

We must not embroil ourselves in a runaway multiculturalism that treats scientific knowledge as a culture that is equivalent to "other ways of knowing" or the multifarious other *truths* (Kurtz 1998; Montellano 1998). Science has proven to be a superior method of acquiring knowledge (Schick 1997). This knowledge is the product of immense hard work and creativity. It is a profound heritage and deserves to be celebrated. Conveying this profoundness is an important part of understanding science.

Educators need to help students distinguish evidence from propaganda, rational beliefs from superstitions, and cogent worldviews from fantasy (Gibbs 1999). To foster such thinking, students must be willing to judge (when warranted) others' claims, philosophies, or assertions as false, delusional, or unsubstantiated. Science permits people to make well-informed judgments based upon evidence and scientific concepts. We must recognize nature's factuality. For instance, Newton's Second Law ($F=ma$) comes much closer to reflecting an absolute truth than the principles of astrology. This argument is not to say science is devoid of cultural influences, but that the extent of these influences must be proportionally reasoned.

The National Center for Homeopathy Web site states that "Homeopathy is a system of medicine that is based on the Law of Similars. The truth of this law has been verified experimentally and clinically for the last 200 years." The National

Council Against Health Fraud Web site, on the other hand, has a nice and well-argued position paper on why homeopathy is a pseudoscience.

Romanticism

Romanticism is the philosophy that some mysteries of the human experience should not be explained away by science, because to do so would coldly destroy the beauty, glamour, or fascination of the mystery. As writer Shari Waxman put it, "No one wants to be debriefed after a magic show" (Waxman 2003). Stories of haunted houses, alien abductions, communications with the dead, fortune telling with tarot cards, etc., all have a psychological lure. People should know that a well-designed experiment or elegant theory exudes beauty. Stephen Gould conveyed this essence in his essay *The Median Isn't The Message* (Gould 1985). Gould contends that, in some circles of human experience, the intellect gets short shrift and is viewed as outmoded elitism. He makes it clear that science, properly viewed, is profoundly nurturing and life-giving. Richard Feynman also talked about the beauty of science: "My lament was that the kind of intense beauty that I see given to me by science is seen by so few others, by few poets, and therefore, by even fewer more ordinary people..." (Feynman 2005).

To illustrate the concept of romanticism, consider a tombstone that can be found in the main cemetery of Marion, Ohio (Saberi 2003). Figure 4 shows a schematic diagram of the tombstone. It consists of a polished, granite sphere weighing over two tons sitting atop a stone pedestal. The granite sphere is slowly rotating with time! The light colored circle is unpolished granite that was once on the bottom of the sphere and has rotated up. If you start thinking of supernatural or unexplainable forces, you are engaging in romanticism. A mind more finely tuned to science will find the movement fascinating and will first and foremost examine all the natural hypotheses to find out why the circle moves. It may be happening because water accumulates beneath the sphere and then freezes and expands, thus lifting the sphere a small amount. The ice then might melt unevenly with the side facing the sun melting first causing the shift; or perhaps the explanation lies more with human nature. Hoaxers might purposely rotate the sphere by some means late at night. For whatever influence, the unpolished circle is observed to shift about 5 cm per year.

Antiscience

Antiscience is a cultural movement rebelling against the establishment of science. Hans Christian von Baeyer describes this movement as people who "fear science and react by belittling it; they deny its objectivity. . . . Science, especially physical science, has become so abstract that non-scientists simply have no access to it. The most sensitive among them lament their own terrifying alienation from science and feel it as a form of humiliating impotence" (Baeyer 1998). The best example is the faction of people against any form of biotechnology and genetic engineering. There certainly exist important ethical and environmental issues surrounding this technology but some people—often not trained in the science of molecular biology—consider it playing God and will rebel.

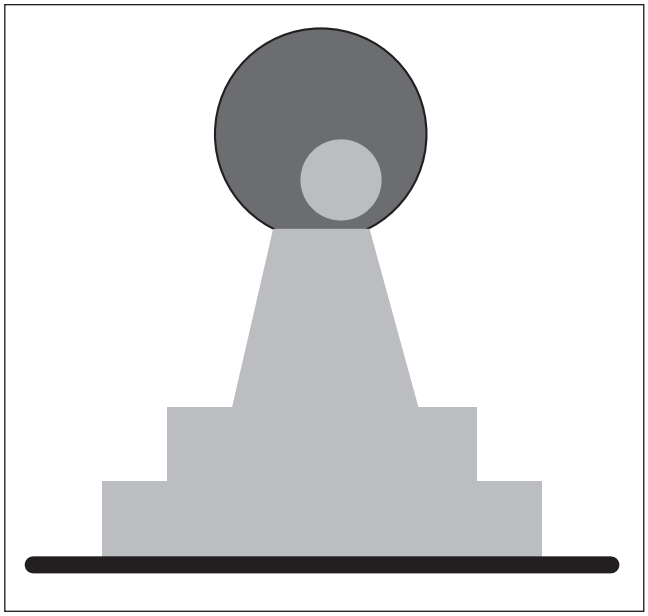

Figure 4. Diagram of a tombstone with a granite sphere on top of a stone pedestal

Genetically engineered trees and research facilities growing such trees have been targets of ecoterrorism (Edwards 2001). It is believed that an arsonist targeted the University of Washington's Center for Urban Horticulture in 2001 because of biogenetic research being conducted there (Heckman 2001).

Secrecy

Secrecy can impede the progress of science, and openness is a hallmark of good science (APS 1999) and good government.

After the September 11, 2001, attacks, the U.S. government decided to remove thousands of documents from shelves and Web pages that were even remotely related to germs and warfare. The president of the American Society of Microbiology, Ronald Atlas, found this move troubling and described it as seriously undermining science (Broad 2002). There are numerous examples of government secrecy used for political expediency as opposed to national-security interests (Scott 2003).

In 2004 about 15 million documents were classified at a cost of $7 billion dollars (Northam 2005). William Leonard, head of the National Archives' information security oversight office, indicated that 25,000 documents from the National Archives were reclassified and removed from the shelves since 1995. An audit into the classifying process revealed that 24 percent of these documents should not have been classified, and 12 percent were questionable (Yen 2006).

The skewing of scientific information so that it conforms to political agendas is a major concern. In 2004, the Union of Concerned Scientists initiated a program to restore scientific integrity to policymaking. Toward this goal, more than sixty leading scientists—Nobel Laureates, medical experts, former federal agency directors, and university chairs and presidents—

signed a statement voicing their concern about the misuse of science in government (Union 2004). These efforts helped pass historic congressional legislation (Union 2006) in late 2005. This legislation banned political litmus tests for federal advisory committees and banned the deliberate distribution of false scientific information.

The Jan Hendrik Schön scandal is one specific instance of secrecy impeding science. Schön was a Bell Labs physicist who had fifteen papers from the journals *Science* and *Nature* recently withdrawn due to scientific misconduct (Bell Labs 2002; Wikipedia 2006). Schön's scandal fits within a broad definition of secrecy that includes the purposeful propagation of misinformation.

Deceptive Consumer Marketing

Deceptive marketing techniques can also hurt science literacy. The Federal Trade Commission's Web pages are replete with specific examples. Advertisements masquerading as news articles and television news segments are examples of stealth marketing. A local newspaper ran an article (Anonymous 2003) with the title "90 Percent Concerned about Drinking Water." The article presented several aspects about water-quality science and looked exactly like a typical news story. But the last paragraph included: "*For more information about Moen's PureTouch filtering faucet and PureTouch AquaSuite, contact. . . .*"

Sheila Anthony, an FTC Commissioner, states, "We are watching all advertising media—not just the Internet, but direct mail, infomercials, coupon inserts, talk radio, and national newspapers, and we are seeing questionable claims everywhere we turn" (Anthony 2002). The Arm & Hammer Company instructs people to place a box of baking soda into their refrigerators to keep food tasting fresher longer. (Arm & Hammer 2003) A careful, double-blind clinical experiment needs to be done to examine the legitimacy of this claim. Obtuse or fraudulent marketing claims can erode the general public's respect for science because the claims are often said to be *scientific* or *tested*.

Religion

Religion's symbol can range from neutral to extremely detrimental. Any religious philosophy that impedes a person's accurate understanding of the behavior of nature is an affront to science. John Rigden (2005), in the *American Journal of Physics*, describes this demarcation between science and religion:

> The Divine Designer belief is, per se no threat to science. If, however, it is denied that physical laws initiate chains of cause and effect that culminate in the beautiful world we observe, if it is denied that science is mechanistic and deterministic, and if these denials become part of the science classroom, then science as we know it is dead. Are the delicate filigrees of frost on a cold window pane caused by anything other than natural mechanism driven by physical law?

Among the contentious issues between science and religion are biological evolution, stem-cell research, genetic engineering, and earth/cosmological evolution. Constructive dialogue should begin by recognizing that abuse or misuse exists in religion (and science).

Incorporating intelligent design into science classrooms is an obvious impediment to scientific progress. Consider the case of a religiously affiliated group in Ohio called Science Excellence for All Ohioans (SEAO) (Science Excellence 2006). This group refers to *methodological naturalism* in a derogatory sense and views it as a censoring tool to keep intelligent design out of the science classroom. Yet physics professor Lawrence Krauss considers methodological naturalism synonymous with the scientific method (Krauss 2006). Thus, the SEAO is being critical of the scientific method.

By recognizing affronts to scientific inquiry, we can better prepare ourselves and the public to be critical thinkers.

References

Anonymous. 2003. 90 percent concerned about drinking water. *Dunn County News*, April 30: A13.

Anthony, Sheila. 2002. Combating Deception in Dietary Supplement Advertising. Food and Drug Law Institute 45th Annual Educational Conference, Washington, D.C., April 16.

APS. 1999. What Is Science? Policy statement. American Physical Society Council.

Arm & Hammer. 2003. Available at www.armhammer.com/myhome/room_pop.asp?Room=Kitchen&Attribute=deodorizing&name=Do It All Deodorizer.

Baeyer, Hans Christian von. 1998. Science under siege. *American Journal of Physics*. 66(11): 943.

Bell Labs. 2002. *Report of the Investigation Committee on the Possibility of Scientific Misconduct in the Work of Hendrik Schön and Coauthors*. Available at www.ruf.rice.edu/~natelson/papers/summary.pdf.

Broad, William J. 2002. U.S. tightening rules on keeping scientific secrets. *New York Times*, February 17.

Carroll, Robert Todd. 2002. Feng Shui. *Skeptics Dictionary*. Available at www.skepdic.com/fengshui.html.

Dawkins, Richard. 2003. *A Devil's Chaplain*. New York: Houghton Mifflin Publishing.

DeWitt, Bryce. 2005. God's rays. *Physics Today*. January: 34.

Edwards, Bob. 2001. Genetic trees a target for eco-terrorists. *National Public Radio: Morning Edition*. July 3.

Feynman, Michelle. 2005. The letters of Richard P. Feynman. *National Public Radio: Science Friday*. May 6.

Feynman, Richard. 1963. *The Feynman Lectures on Physics*. Boston: Addison-Wesley Publishing.

Gibbs, Wayt W., and Douglas Fox. 1999. The false crisis in science education. *Scientific American* (October): 87–93.

Gould, Stephen Jay. 1985. The median isn't the message. *Discover*. June.

Heckman, C. 2001. Irreplaceable books ruined in arson blaze at UW. *Seattle Post-Intelligencer*. May 30.

Krauss, Lawrence M. 2006. When worldviews collide: Science and religion face off again. APS News, April 8.

Kurtz, Paul. 1998. The antiscience problem. In *Encounters with the Paranormal: Science, Knowledge, and Belief,* edited by Kendrick Frazier. Amherst, N.Y.: Prometheus Books: 65.

Lancaster, J., and K. Khan. 2004. Nuclear scientist loses job. *Washington Post*, February 1: 2A.

Let Us Reason Ministries. 2002. *Acupuncture—Acupressure*. Available at www.letusreason.org/Nam10.htm.

Melott, Adrian. 2002. Intelligent design is creationism in a cheap tuxedo. *Physics Today*. June: 48.

Montellano, B.O. 1998. Multicultural pseudoscience: Spreading scientific illiteracy. *Encounters with the Paranormal: Science, Knowledge, and Belief*, edited by Kendrick Frazier. Amherst, N.Y.: Prometheus Books.

NABT. 2000. Statement on Teaching Evolution. *NABT Board of Directors*. Available at www.nabt.org/sub/position_statements/evolution.asp.

National Center for Homeopathy. 2006. What Is Homeopathy? Available at www.homeopathic.org/whatis.htm.

National Council Against Health Fraud. 2006. *NCAHF Position Paper on Homeopathy*. Available at www.ncahf.org/pp/homeop.html.

Northam, Jackie. 2005. Government documents increasingly classified.

National Public Radio: Politics and Society, September 8.
NSTA Position Statement. 1997. The Teaching of Evolution. NSTA Board of Directors. Available at www.nsta.org/positionstatement&psid=10.
Pennington, Matthew. 2003. Pakistan admits to having rogue scientists. *Associated Press*. December 23.
Raymo, C. 1998. Scientific literacy or scientific awareness. *American Journal of Physics*. 66(9).
Rigden, John. 2005. The mystique of physics: Relumine the Enlightenment. *American Journal of Physics*. December: 1095.
Saberi, Reza. 2003. Great balls of mystery! *Skeptic* 10(2):12.
Sagan, Carl. 1996. *The Demon-Haunted World: Science as a Candle in the Darkness*. New York: Ballantine Books.
Sampson, W. 2002. Alternative attraction. *Scientific American Frontiers, Public Broadcasting Network*. Available at www.pbs.org/saf/1210/features/attraction.htm.
Schick, Theodore Jr. 1997. The end of science? SKEPTICAL INQUIRER 21(2) (March/April):36–38.
Schick, Theodore Jr., and Lewis Vaughn. 1999. *How To Think about Weird Things: Critical Thinking for a New Age*. Columbus, Ohio: Mayfield.
Schnall, Peter. 2001. Air Force One (video). *National Geographic*.
Science Excellence for All Ohioans. 2006. The Problem. Available at www.sciohio.org/.
Scott, Alan. 2003. Sniffer Plane Secrets and Political Courage. *Forum on Physics and Society* (*American Physical Society newsletter*), January.
Union of Concerned Scientists. 2004. Restoring Scientific Integrity in Policymaking. Available at www.ucsusa.org/scientific_integrity.
———. 2006. Update on Scientific Integrity Legislation and Amendments. Available at www.ucsusa.org/scientific_integrity/restoring/scientific-integrity-legislative-information-page.html.
Waxman, Shari. 2003. Mind over media. *Skeptic* 10(2):82–84.
Weinberg, Steven. 1977. *The First Three Minutes: A Modern View of the Origin of the Universe*. New York: Basic Books.
Wikipedia. Jan Hendrik Schön. 2006. Available at http://en.wikipedia.org/wiki/Jan_Hendrik_Sch%C3%B6n.
Yen, Hope. 2006. Archives: 1 in 3 records wrongly resealed. *Seattle Post-Intelligencer*, April 26. □

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Theatre of Science

Two academics show—somewhat to their own surprise—that there is an audience for a live stage science show. And they have fun doing it. Will others follow?

RICHARD WISEMAN

Simon Singh and Richard Wiseman

Around the turn of the last century, theatergoers could enjoy many different forms of entertainment, including drama, music, comedy, and . . . wait for it . . . *science shows*. Surprising as it may now seem, leading scientists of the day were prepared to take off their lab coats, put on some greasepaint, and tread the boards. Packed houses would watch in awe as these learned men demonstrated the very latest scientific advances, including electrical wonders, amazing chemical reactions, and the marvels of magnetism. Unfortunately, this heady mixture of entertainment and science didn't stand the test of time, and within a few years the scientific showmen found themselves out of the limelight and back in the less glamorous world of lecture theaters and public halls.

Fast-forward about a century or so to late 2001, when I received a telephone call from science writer Simon Singh. Simon and I first met about ten years ago when we worked together on an episode of the well-known BBC television science program *Tomorrow's World*. Simon had called to ask if I was interested in being involved in a joint project. He thought it would be fun for us to turn back the hands of time and co-present a science show at a London theater. I was initially skeptical for two reasons. First, it wasn't my idea. Second, I wasn't convinced that the latest discoveries in physics and mathematics would really hold the attention of a modern audience. Sure, there were lots of successful science shows for children, and even some aimed at family audiences, but Simon wanted to move beyond that. He was eager to reach regular theatergoers, essentially asking them to choose science over Shakespeare. The challenge seemed considerable, but it was an interesting idea, and I agreed to be involved.

Simon persuaded The National Endowment for Science, Technology, and the Arts (NESTA) to fund the project, and he invited theater director Portia Smith to help create the show. After much deliberation, we settled upon the title *Theatre of Science*, and set about finding an off-West End venue in London. Our initial approaches were met with a dispiriting mixture of disbelief and skepticism, with several theater managers telling us that a science show simply wouldn't attract an audience. However, persistence paid off, and we eventually found a venue willing to host the show. The Soho Theatre is located in the heart of London's theater district, and has forged a considerable reputation for staging unusual and cutting edge performances. The Soho's manager liked the idea of taking science out of the lab and onto the stage and offered us a run at his theater.

After a few days of rehearsal, the show started to take shape. The first half involved Simon illustrating various aspects of probability theory by demonstrating gambling scams and undertaking bets with members of the audience. After a short interval, I explored the psychology of deception and lying with the help of magic tricks and optical illusions. Strictly adhering to a "show don't tell" principle, rule, both halves involved as much audience interaction as possible. For example, when discussing the efficacy of lie detectors, we hooked up an audience member to a polygraph and projected that person's physiological data live onto a large screen as he attempted to deceive the audience. We also thought it a good idea to inject some comedy into the proceedings. Simon started off the show by using mathematics to "prove" that the Teletubbies are evil, and undermined *The Bible Code* by pointing out that the same principles can be used to demonstrate how the death of Diana Princess of Wales was "predicted" within the pages of *Moby Dick*. We also made a conscious decision to construct a show that was decidedly low-tech, simply equipping ourselves with an overhead projector, some acetates, and a couple of marker pens. We ditched the idea of any staging, including wings or sophisticated lighting plots, and chatted with the audience as they walked into the auditorium. This low-tech approach to staging seemed appropriate. Science is all about trying to discover how the world really works, and so it seemed appropriate to remove the various theatrical devices usually employed to help an audience suspend disbelief and instead present the show in a far more straightforward way.

Richard Wiseman, left, explores the anatomy of contortionist Delia Du Sol, right.

We opened at The Soho Theatre in March 2002. The idea of two academics venturing onto a West-End stage armed with just a few acetates and a couple of theories attracted the attention of the media, and the show received considerable press and radio coverage. As a result, our initial run quickly sold out and the theater was happy to add some additional dates. The performances drew a strong response from both the audience and reviewers alike. One newspaper, *The Evening Standard*, wrote that the show "almost makes academia sexy" and described it as "a unique masterclass on the mind." Similarly, *What's On* magazine called it "an uplifting, thought-provoking

Richard Wiseman is Professor of the Public Understanding of Psychology at the University of Hertfordshire in the U.K. He is a fellow of the Committee for Skeptical Inquiry and a SKEPTICAL INQUIRER *consulting editor. For more information about his work, visit www.richardwiseman.com.*

and frequently hilarious alternative to the usual theatre fare." Perhaps more important, feedback forms indicated that about half of the audience had absolutely no background in science, nor had attended any previous science-based event. The show was taking science to this new audience simply by being performed in an accessible way within a theatrical context. One online review underlined this point, noting, "Don't fear the men in white coats, this is an entertaining hour for even the most scientifically illiterate."

The Royal Society was kind enough to provide funding for us to take the show up to the Edinburgh Fringe Festival in August 2002, and we again attracted a sell-out audience. Flushed with success, Simon and I did nothing more with the show for a couple of years. Then, in 2005, again supported by NESTA, we decided to stage a more ambitious version of the show back at the Soho Theatre. We devised various new items. For example, each night Simon was given just three minutes to explain the entire history of the universe, and then he demonstrated the concept behind redshift by electrocuting a gherkin.

Part of the expansion process involved bringing other performers on board. A few years earlier, I had worked with Delia Du Sol, one of the U.K.'s top contortionists, on a project exploring the science of anatomy. This work had involved taking MRI scans of Delia as she performed extreme back-bends. During *Theatre of Science*, we showed these scans to the audience prior to them watching Delia's performance, in order that they had a much greater understanding of how her unique anatomy allowed her to bend her body into seemingly impossible shapes. We also invited musicians Sarah Angliss and Stephen Wolf to perform the world's only theremin duet, and explain how electromagnetism allowed the performers to play these unique instruments without touching them.

While developing ideas for the show, I came across a quote from magician Harry Houdini, stating that, if a performer wants to guarantee a full house, he or she should simply advertise the fact that a stunt is being performed that may result in death. The words resonated with me, and I started to look around for a genuinely dangerous, but science-based, stunt that could be performed in the intimate setting of the Soho Theatre.

Eventually, I came across HVFX—a company that makes high-voltage electricity equipment for television and stage. I approached them and explained our situation, and technical director Nick Field kindly agreed to put together something for the show. He constructed two rather odd looking metal pillars, known as Tesla coils, capable of generating six-foot bolts of million-volt lightning. HVFX also built a coffin-shaped cage that would go between the coils and absorb the full force of the strikes, assuring us that various thus far incontrovertible laws of physics meant that it was safe to stand inside the cage. As a finale to the show, either Simon or myself entered the coffin-shaped cage and absorbed the full force of the strikes. There was no room for error, as the bolts of lightning were potentially lethal.

The staging of such a dangerous stunt attracted a large amount of media attention, and, once again, we quickly sold out for the entire run. Again we added more nights, and again they too sold out. We proved that science could hold its own against more mainstream forms of theater, and the reviews were positive, with, for example, *The Times* remarking that "the spirit of Houdini lives on."

In 2006, we were invited to perform the show for a short run in an off-Broadway theater. Cosponsored by the Center for Inquiry office in New York as part of an arts and science festival being organized by CFI Director Austin Dacey, we boxed up the show and crossed the Atlantic. The Theater For The New City is located in the heart of New York's East Village district—an area home to several other unusual off-Broadway shows including The Blue Man Group and Stomp. The theater's cavernous auditorium provided a perfect Frankenstein-like setting for the show and allowed us to crank up the output from the coils.

The hefty construction of our cage had prevented us shipping it to America, and so we had to create a new cage onsite. Unfortunately, obtaining a generator that could produce the power required by the European coils proved surprisingly time-consuming, and so we had precious little time to construct our new "cage of death." A quick trip to a couple of hardware stores resulted in a stack of six-foot-long metal tubes, a small saw, a roll of thin metal mesh, and a pair of industrial scissors. Simon and I set to work and managed to hastily construct a wobbly-but-workable cage, finishing just fifteen minutes before the opening performance. The curtain went up and we faced our first American audience. Fifty minutes later, with the stage bathed in red light, we moved the cage between the coils, and Simon bravely climbed inside. The coils buzzed into action, and the bolts of lethal lightning slammed into the somewhat shaky structure. Simon emerged alive, and the audience cheered.

It was only later that we discovered that the new cage was potentially far more lethal than the one we had used in Britain. The U.K. cage is constructed from thick copper tubing, making it safe for the performer to touch the inside of the cage. However, the much thinner mesh we had used in the U.S. meant that touching the inside of the cage would, if you excuse the pun, prove to be a shockingly lethal experience.

We played to packed houses, again showing that there is an audience willing to spend a scientific night out at the theater (or watch scientists risk death). We will remember the experience for a long time, not only because of the buzz of taking the first science show off-Broadway, but because night after night, we were a little too close to the one thing that, performers dread—dying on stage.

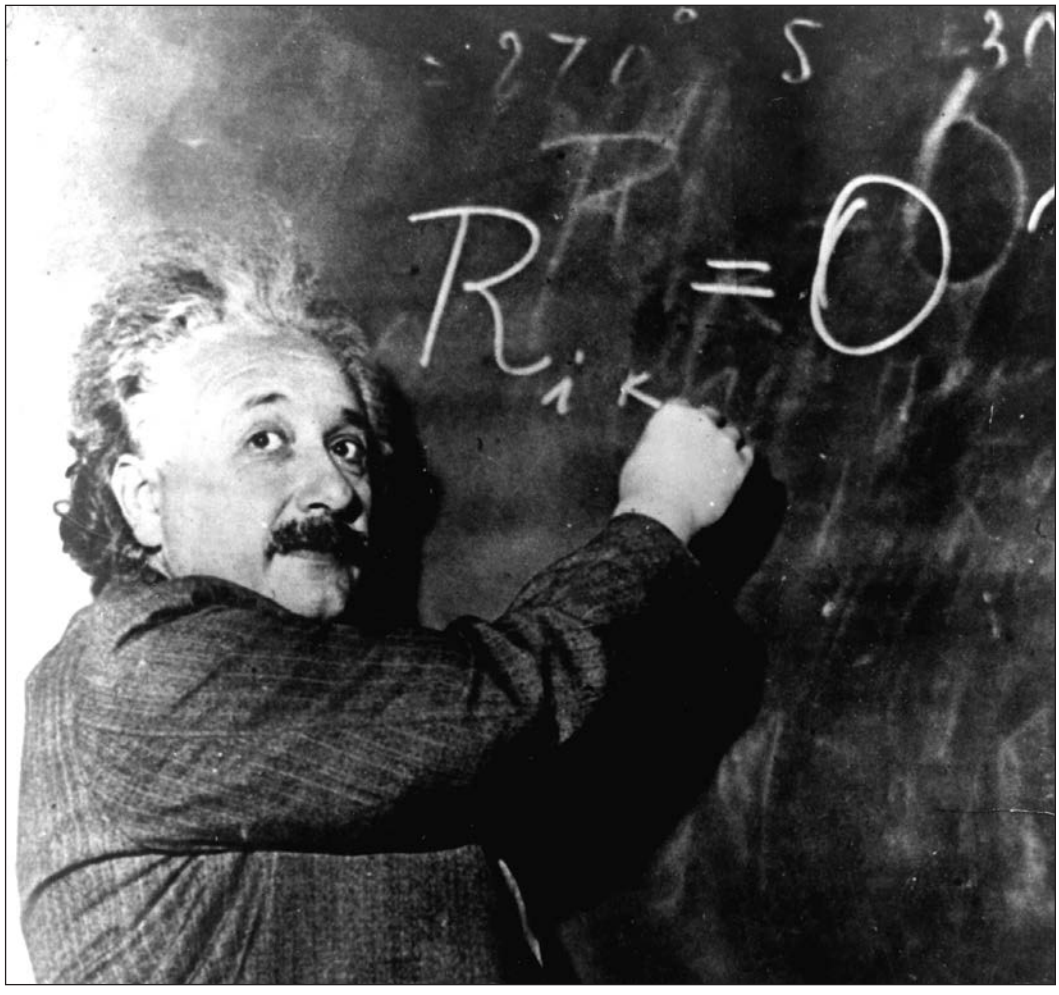
Five years ago, I fully expected Theatre of Science to be a one-time set of performances that would not do especially well. I am happy to admit that I was wrong. There *is* an audience for science. It is all a question of presenting it in the right way. A century ago, some of the world's leading scientists took to the stage to educate and excite the public about their work. Our experiences suggest that they were onto something, and our hope is that other academics will now step into the limelight and continue the tradition that is theater of science. □

The Myth of Consistent Skepticism

The Cautionary Case of Albert Einstein

Being a skeptic implies that we consistently apply the methods of skepticism to all claims. However, all skeptics, even Einstein, are, at best, selectively skeptical.

TODD C. RINIOLO and LEE NISBET



Many readers of the SKEPTICAL INQUIRER (the authors included) have labeled or referred to ourselves as "skeptics," which implies objectivity in our approach to evaluating various claims. However, we all have limitations and built-in biases that hinder our ability to apply the methods of skepticism objectively and consistently. Nonskeptics and professed skeptics alike are equally vulnerable to developing beliefs that have not been subjected to rigorous skeptical inquiry. Furthermore, skeptics (like nonskeptics) may refuse to change their viewpoints even in the face of substantial discrediting evidence.

Thus, skeptics would be well served to realize that we are selectively skeptical. Our purpose here is to (a) make clear why no consistent skeptic exists, (b) review the major biases that obstruct our ability to apply skepticism consistently, (c) provide a concrete example of selective skepticism in a great mind (Albert Einstein), and (d) challenge skeptics to reevaluate their own ability to apply the methods of skepticism consistently.

While beliefs can be modified, research shows that we all possess biases that not only typically strengthen existing beliefs (both true and false), but often maintain beliefs in light of strong contradictory evidence.

Does a 'Consistent Skeptic' Exist?

We are defining a "consistent skeptic" as an individual whose entire belief system is composed of beliefs that have been subjected to objective skeptical inquiry. Even those of us who claim to be skeptics are vulnerable to nonskeptically formed beliefs. This is because (a) we do not have time to evaluate every claim that becomes part of our belief system and may rely upon what is commonly believed or what we would like to be true; (b) we are more likely to perform a skeptical evaluation for claims that are inconsistent with our current belief systems (e.g., psychic powers), while simply accepting claims consistent with our beliefs (e.g., Einstein was a skeptic); (c) many beliefs are already formed and reinforced prior to learning how to think skeptically; (d) some beliefs are formed based primarily upon an emotional evaluation; and (e) skeptics have limited areas of expertise (e.g., a biologist may know little about economics), which restricts our ability to skeptically evaluate all potential claims because knowledge is extremely specialized.

Next, a "consistent skeptic" continually subjects his or her beliefs to possible modification based upon an objective evaluation of further evidence. While beliefs can be modified, research shows that we all possess biases that not only typically strengthen existing beliefs (both true and false), but often maintain beliefs in light of strong contradictory evidence. We will briefly discuss three relevant biases inhibiting consistent skepticism: the confirmation bias, biased assimilation, and belief perseverance (see Gilovich 1991 for further examples of how our cognitive systems can mislead us).

First, we all look for evidence that is consistent with our beliefs. In short, we tend to believe what we wish to be true, but we do so "objectively." Specifically, we typically do not seek out discrediting evidence for our current beliefs with the same vigor that we look for supportive evidence (Gilovich 1991). Psychologists call this a *confirmation bias* (see Nickerson 1998 for a review). Confirmation bias has been demonstrated in a wide variety of contexts (e.g., stereotypes, political beliefs, financial decisions, beliefs in psychic abilities), and serves to strengthen current beliefs. Furthermore, the confirmation bias generates additional collateral "evidence," allowing beliefs to persist even when the initial evidence is discredited, because we can draw on evidence obtained from a variety of sources. As a quick test of the confirmation bias, readers can look through their personal collections of books. Do you have an equal number of books that are both consistent and inconsistent with your beliefs? Do you subscribe to or read periodicals, newspapers, etc. that present perspectives contrary to your political beliefs? (The authors confess that their book collections and periodical and newspaper subscriptions are highly skewed in favor of their political beliefs.) Likewise, how do you feel about opposing political perspectives, especially concerning issues you are keenly interested in (e.g., the current Iraq war, school vouchers, privatization of Social Security accounts)? Do your feelings influence your assessment of the correctness of different perspectives? Likewise, are you surrounded primarily by others that share your views, which in turn strengthens your beliefs (i.e., group polarization)? A consistent skeptic would not be biased toward confirmatory evidence.

Todd C. Riniolo is Associate Professor of Psychology at Medaille College (Buffalo, New York). He has published articles in such journals as Psychophysiology, Brain & Cognition, Infant Behavior and Development, Teaching of Psychology, *and* Skeptic. *In addition to teaching traditional psychology courses, he also teaches a specialty course in skepticism (Parapsychology & Pseudoscience). E-mail: triniolo@medaille.edu. Lee Nisbet is Professor of Philosophy at Medaille College (Buffalo, New York). He is both a founding member and Fellow of CSI and has published in a wide variety of professional journals and popular magazines. He has edited two volumes on the gun control debate (1990, 2001) presenting the best research on both sides along with suggesting strategies of evaluation. He is presently working on a volume dealing with the sex-differences debate. E-mail: lnisbet @medaille.edu*

Second, we are biased in assimilating information into our belief systems. Not only do we seek out information that supports our beliefs, but we also apply differing standards of evidence. As research has demonstrated, "People who hold strong opinions on complex social issues are likely to examine relevant empirical evidence in a biased manner. They are apt to accept 'confirming' evidence at face value while subjecting 'disconfirming' evidence to critical evaluation, and as a result to draw undue support for their initial positions from mixed or random empirical findings" (Lord, Ross, and Lepper 1979, p. 2098). A consistent skeptic would apply the methods of skepticism to all claims consistently and evaluate the evidence in an unbiased manner (i.e., without double standards).

Finally, many studies have demonstrated that it can be difficult to change a belief even when substantial discrediting information is provided (i.e., belief perseverance; see Anderson and Kellam 1992). This is especially true when we have constructed a rationale supporting the belief, or for strongly held emotional beliefs (Edwards 1990). Belief perseverance explains why a "true believer" (e.g., Sir Arthur Conan Doyle, who believed that mediums could communicate with spirits) continues to maintain beliefs despite powerful discrediting evidence (e.g., Harry Houdini's exposure of mediums as frauds or confessions by the mediums). Furthermore, research by Tetlock (1998, 1999) has shown that experts also go to great lengths to maintain belief systems, even in the face of strong evidence that should force them to reconsider viewpoints. A consistent skeptic should obviously use discrediting information to modify beliefs.

Not only do we lack the time and universal expertise to be consistent skeptics, but our minds have a variety of built-in biases that directly hinder nonselective skepticism. These biases are especially powerful in defending long-held beliefs in which we have a strong emotional investment. Even the most ardent skeptic does not like to have his or her most cherished beliefs subjected to rigorous skeptical inquiry.

Albert Einstein: A Selective Skeptic

Albert Einstein's scientific contributions, like those of Charles Darwin or Isaac Newton, have shaped the way we view the universe. Einstein had a great mathematical mind, and has become a scientific icon. Einstein, most likely because of his scientific achievements, was voted one of the ten outstanding skeptics of the twentieth century by the Fellows and Scientific Consultants of CSICOP (see SKEPTICAL INQUIRER, January/February 2000). However, Einstein was no skeptic when evaluating evidence outside of his field of expertise. As skeptics are well aware, scientists sometimes look foolish when venturing outside of their disciplines.

Einstein held a wide range of beliefs beyond his contributions to science and outside his area of expertise. For example, in 1933, Einstein (we believe correctly) voiced his opinion about political liberty in Germany, "As long as I have any choice, I will only stay in a country where political liberty, toleration, and equality of all citizens before the law are the rule. Political liberty implies liberty to express one's political views orally and in writing, toleration, respect for any and every individual. These conditions do not obtain in Germany at the present time" (Einstein 1949, p. 81). Einstein openly criticized Nazism and the brutalities that occurred under that government.

Einstein was also sympathetic to the Soviet style of government, likely because that particular form of government was consistent with many of his political views (e.g., a belief in a centrally planned economy), combined with the looming threat of Nazism in Europe (Laqueur 1990). Einstein was not alone in his political beliefs. Capitalistic societies were in the midst of the Great Depression, and as Caute (1988) points out, many scientists in the 1930s endorsed the Soviet system because of the "notion that the most rapid scientific advances are made by a system which methodically relates research to the solution of social problems" (p. 272). To these scientists, the Soviet Union could become a vast experiment in which scientists would play a vital role in engineering a human society.

Not only do we lack the time and universal expertise to be consistent skeptics, but our minds have a variety of built-in biases that directly hinder nonselective skepticism.

Thus, Einstein had strong beliefs in both political liberty and the Soviet style of government during the 1930s. Interestingly, Einstein refused to join or endorse an international commission headed by John Dewey to investigate the Moscow Show Trials (a consistent skeptic would seek both confirmatory and discrediting evidence) and would subsequently write to Max Born that "there are increasing signs the Russian trials are not faked, but that there is a plot among those who look upon Stalin as a stupid reactionary who has betrayed the ideas of the revolution" (quoted in Born 1971, p. 130). Born would later comment that most people in the West at the time believed the trials "to be the arbitrary acts of a cruel dictator." Einstein, however, relied upon information from people he described as "those who know Russia best."

The important point, however, is that Einstein's positive beliefs toward the Soviet Union did not change as substantial information came forth demonstrating that the Soviet Union was a totalitarian state that did not tolerate political liberty. Einstein was never shy about judging capitalism or Nazism by their deeds and actions instead of their rhetoric. He did not apply

this standard to the Soviet Union. A consistent skeptic would not use double standards to evaluate different forms of governments.

If Einstein was a consistent skeptic, one would predict that, as the accumulating evidence came forth over the years, Einstein would modify his beliefs and become a leading critic of both Stalin and the Soviet Union for their violations of political liberty. Millions of Soviet citizens were arbitrarily murdered as a direct result of government action, and millions more were put into slave labor camps. While Einstein's writings, letters, and correspondence on this issue are scattered, his correspondence with the philosopher Sidney Hook on this specific issue is most enlightening (and disturbing). We encourage you to read chapter 28 ("My Running Debate with Albert Einstein") in Hook's (1987) autobiography, *Out of Step: An Unquiet Life in the Twentieth Century.* The chapter relies heavily upon letters exchanged between the two men, and reading the chapter in its entirety provides a much richer context than the brief summary we provide here.

Einstein, a professed believer in political liberty, virtually refuses to criticize the Soviet government and justifies the murders and creation of slave labor camps.

Einstein, a professed believer in political liberty, virtually refuses to criticize the Soviet government and justifies the murders and creation of slave labor camps. The closest Einstein comes to criticism of the Soviet government is contained in the first sentence of the following quote. However, the next sentence speaks for itself. According to Einstein in 1948, "I am not blind to the serious weaknesses of the Russian system of government and I would not like to live under such government. But it has, on the other side, great merits and it is difficult to decide whether it would have been possible for the Russians to survive by following softer methods" (Einstein quoted in Hook 1987, p. 471).

Hook responded with a lengthy letter, pointing out many inconsistencies in Einstein's reasoning when it came to the Soviet Union:

> Precisely what methods have you in mind? I am puzzled on what evidence anyone can assert that cultural purges and terror in astronomy, biology, art, music, literature, the social sciences, helped the Russians to survive, or how the millions of victims in concentration camps of the Soviet Union, not to speak of the wholesale executions, contributed in any way to the Russian victory over Hitler. The Russians defeated Napoleon who was relative to his time even mightier than Hitler. But I don't believe you would find it difficult to decide that this in no way constituted a historic justification of serfdom. (p. 473)

Einstein did not respond to Hook's letter. We would have expected some reply, at least claiming that Einstein was misunderstood. However, other writings by Einstein indicate that he believed, for the Russian people, "a painful *temporary* renunciation of his personal independence" was necessary and that Einstein himself would have "deemed it my duty to make this temporary sacrifice" (Einstein quoted in Hook, 1987, p. 476). Thus, for the Soviet people, Einstein abandons his own views about political liberty (a clear double standard). Max Born (1971) also found Einstein's views toward the Soviet Union "hard to reconcile" (p. 131). Hook (1987) summarizes that he "was mystified by Einstein's failure to come to grips with the revelations of the victims of Stalin's terror" (p. 478). Unfortunately, Einstein was not alone, as many intellectuals, perhaps attracted to the lofty goals of communism, refused to acknowledge the devastating actions of the Soviet government (Sowell 1996).

Einstein does not demonstrate the hallmarks of a consistent skeptic when it comes to his evaluation of the Soviet Union. It is doubtful that anyone committed to rigorous skepticism would agree with Einstein's view that a government has the right to murder millions of its own citizens and create slave labor camps as a preemptive strategy if it believes it will be attacked at some future date. Interestingly, Einstein judged the German people to be "the land of mass-murderers" (Einstein quoted in Born 1971, p. 199) and the individual citizen personally responsible for the crimes of the Nazi regime. However, by this standard, Einstein himself would have felt it justified if he was murdered for "correct" political reasons, or himself part of a land of mass-murderers if he lived in the Soviet Union under Stalin. The great irony is that Stalin's government, like Hitler's, murdered millions of its own citizens and did not tolerate political liberty. Only a "true believer" could not make that assessment.

We encourage readers to compare Sir Arthur Conan Doyle's justifications to maintaining his beliefs in spiritualism (see chapter 9 of *Houdini: A Magician Among the Spirits*) with Einstein's justifications of Soviet government actions. Both men, when dealing with subjects outside of their expertise, abandoned basic logic, created double standards to evaluate evidence, and did not modify their beliefs in response to overwhelming new evidence.

Einstein's placement in the list of ten outstanding skeptics of the twentieth century itself is an example of selective skepticism. Note that this evaluation was not made by a single individual, but was a cumulative effort by the top skeptics of today. We would be interested to know whether those who voted for Einstein (or for readers who subsequently accepted this belief) simply relied upon what is commonly believed about Einstein or whether a true skeptical inquiry was performed. Of course, we are most interested in whether the information presented in this article would cause those who believe that Einstein was an outstanding skeptic to reconsider that belief.

Summary and Implications

No one is once and for all a skeptic. Skepticism is an ongoing, self-correcting process, not an end to be achieved. It is continually possible to not only backslide but to apply our skepticism inconsistently. We are *all* selective skeptics. Ironically, calling ourselves skeptics may make us less skeptical in objectively evaluating claims because it may create a false sense of our willingness to subject all of our beliefs to the principles of inquiry. Self-knowledge concerning our limitations is useful in two ways: it encourages intellectual humility and honesty *and* it keeps the daunting task of not falling prey to our particular certainties forthrightly in view.

The case of Einstein is cautionary in another respect. Too often, we find skeptics paying rapt attention to the views of scientific celebrities regarding assorted topics to which those celebrities' occupational expertise and accomplishments are totally irrelevant. From a logical point of view, what a renowned physicist, astronomer, or evolutionary biologist has to say about psychology, politics, economics, religion, etc., has no special status whatsoever (just like the Hollywood celebrity who speaks out on these issues). Scientists' claims regarding these issues must stand on their logical and substantive merits alone. Too often, the irrelevancy of scientific celebrity is lost on those who (like all of us) love to be told what they want to hear, especially by people famous for their intellectual accomplishments. Yet, the love of misplaced authority is but another step in the direction of obliviousness to our own selective skepticism.

Simply calling ourselves skeptics is no guarantee that we will objectively apply the methods of skepticism. Self-awareness that we have limitations in expertise combined with built-in biases that hinder our consistent application of skepticism may help to minimize our own selective skepticism. However, if we ignore our own selective skepticism and inconsistently apply the method of skepticism, we run the risk, like Einstein, of deluding ourselves in certain areas like the "true believer" that every skeptic despises.

Acknowledgment

The authors wish to thank Gerald Erion, for his helpful comments and suggestions.

References

Anderson, C.A., and K.L. Kellam. 1992. Belief perseverance, biased assimilation, and covariation detection: The effects of hypothetical social theories and new data. *Personality and Social Psychology Bulletin 18*: 555–565.

Born, M. 1971. *The Born-Einstein Letters.* Irene Born, trans. New York: MacMillan Press.

Caute, D. 1988. *The Fellow-travellers: Intellectual Friends of Communism* (revised edition). New Haven, Conn.: Yale University Press.

Edwards, K. 1990. The interplay of affect and cognition in attitude formation and change. *Journal of Personality and Social Psychology 59*: 202–216.

Einstein, A. 1949. *The World as I See It.* Alan Harris, trans. New York: The Wisdom Library.

Gilovich, T. 1991. *How We Know What Isn't So: Fallibility of Human Reason in Everyday Life.* New York: The Free Press.

Hook, S. 1987. *Out of Step: An Unquiet Life in the Twentieth Century.* New York: Harper & Row.

Houdini, H. 1972 [1924]. *Houdini: A Magician among the Spirits.* New York: Arno Press.

Laqueur, W. 1990. *Stalin: The Glasnost Revelations.* New York: Charles Scribner's Sons.

Lord, C., L. Ross, and M. Lepper. 1979. Biased assimilation and attitude polarization: The effect of prior theory on subsequently considered evidence. *Journal of Personality and Social Psychology 37*: 2098–2109.

Nickerson, R.S. 1998. Confirmation bias: A ubiquitous phenomenon in many guises. *Review of General Psychology 2*: 175–220.

Sowell, T. 1996. *Knowledge and Decisions.* New York: Basic Books.

Tetlock, P.E. 1998. Close-call counterfactuals and belief-system defenses: I was not almost wrong but I was almost right. *Journal of Personality and Social Psychology 75*: 639–652.

———. 1999. Theory-driven reasoning about plausible pasts and probable futures in world politics: Are we prisoners of our preconceptions? *American Journal of Political Science 43*: 335–366.

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A Pathologist Among the Spirits

JOE NICKELL

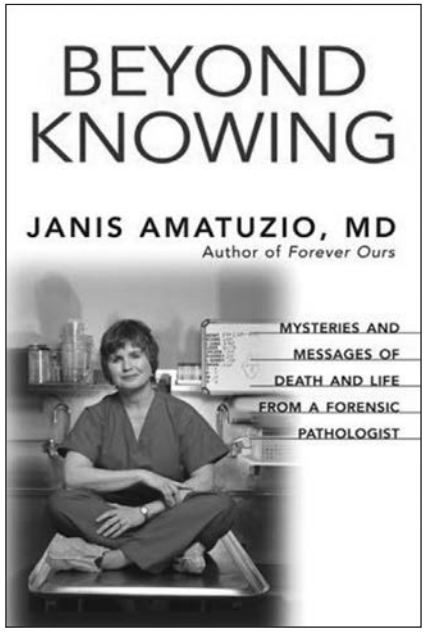
Beyond Knowing: Mysteries and Messages of Death and Life from a Forensic Pathologist. By Janis Amatuzio, MD. New World Library, Novato, California, 2006. ISBN-13:978-1-57731-550-6. 206 pp. Hardcover, $21.95.

Janis Amatuzio, M.D., is a forensic pathologist—one who routinely conducts death investigations and performs autopsies to determine the cause, manner, and mode of death (as, for example, cardiac arrest resulting from arteriosclerosis due to natural causes).[1] She claims her work has also given her evidence of life after death.

In two books—*Forever Ours* (2002) and *Beyond Knowing* (2006)—she has gathered much evidence toward that end. However, it is of extremely poor quality. Consisting of "the dreams, visions, and extraordinary experiences that so many people report following the death of a loved one," the tales represent the very anecdotal evidence that science has found good reason to distrust.

For example, a woman named Laura whose husband had succumbed to disease was heartened by an experience that to her was profoundly mystical. While driving, she heard on the radio what she and her husband had regarded as "our song," containing phrases about "being well in heaven" and "watching over you." She told Amatuzio (2006, xv) "In that moment I changed; I mean, I *knew* without a doubt he was reaching out to assure me that all was well."

Joe Nickell, PhD, a former stage magician, private detective, and teacher of literature, is now a paranormal investigator with SKEPTICAL INQUIRER *science magazine. His Web site is www.joenickell.com.*


BEYOND KNOWING
JANIS AMATUZIO, MD
Author of Forever Ours
MYSTERIES AND MESSAGES OF DEATH AND LIFE FROM A FORENSIC PATHOLOGIST

Now, what is Laura really saying? Of course, the experience was understandably poignant, and it no doubt seemed, as she said, "an astonishing coincidence." But to suggest that her husband was "reaching out" via a song implies that somehow his spirit controlled the record-playing mechanism at the radio station, or telepathically influenced the disc jockey to make that selection, or—the mind boggles.

Amatuzio and many of the people reporting their experiences to her are impressed by coincidences—especially those she terms "extraordinary synchronicities" (2006, 6). (Psychologist Carl Jung [1960] used the term *synchronicity* to describe "meaningful coincidences" that appear to occur in an acausal manner.) One problem in this regard is that people tend to overestimate the rarity of such synchronous events. (For a discussion, see Falk 1981.)

Some of Amatuzio's synchronistic anecdotes involve dreams. For instance, after one of her lectures on mystical experiences, a woman named Theresa told her of a dream she had had. In it, her friend Marge had taken her on a shopping trip and had tried on a maroon dress and gold locket. Theresa stated, "I remember I woke briefly after my extraordinary dream and saw it was midnight." The next day she learned from another friend that Marge had died during the night. When Theresa asked what time that had happened, she received the spine-tingling answer, "About midnight." The following afternoon, when she visited the mortuary, there lay Marge's body clad in a maroon dress and wearing a gold locket (Amatuzio 2006, 141–144).

Such tales are almost formulaic: someone appears in another's dream, the dreamer wakes conveniently to note the time, and he or she later discovers that the death transpired at exactly the time noted. (That the time in the foregoing story was "midnight" bespeaks of its fairy-tale quality.)

Psychologist C.E.M. Hansel (1966, 195–196) notes the elusiveness of dreams as evidence:

> Remembering some event from one's waking life of a few years back is a relatively clear-cut process compared with recalling a dream of last night. Many people recount dreams with the greatest confidence, but since a dream is a private experience there is no way of checking its factual content. It is not surprising that a large number of so-called psychic experiences involve them. The great danger in recalling the content of a dream is not only the ease with which it may be changed or embellished, but that the dating of a dream presents extreme difficulty. If a person after hearing about some event, remembers having dreamed some days before that it would happen, no one can check this fact. He may be remembering something that really happened, or the dream may have been produced and placed at a suitable position in his past at the time he hears the story.

He continues:

> Most memories of past events can be located at some point in time by virtue of the fact that they arise in a context; there are events before and after them. If this context is lacking, it will be difficult to place the memory in time, and it will lack reality. A dream largely lacks this context, and when it is recalled, there is little to guarantee that it happened last night, some other night, or that it was not primarily generated at the time of recall. Just as perception is affected by memory, recall is affected by contemporary conditions, and when the memory is vague, as when a dream is recalled, the amount of material added to it may be large.

Dream synchronicities and other anecdotally reported mystical experiences have been collected by the thousands, but, notes Hansel (1966, 189), "None of the stories investigated has withstood critical examination."

Amatuzio's anecdotes are no exception. As she presents them, they are not even admissible as evidence, lacking sufficient documentation, failing to meet the burdens of evidence and proof, violating the rule of best evidence, and consisting of mere hearsay—among other deficiencies (cf. Hill et al. 1978, 48–53, 131–135, 208–209).

It is surprising that a forensic expert would be so inattentive to good evidence. Indeed, she actually admits, "I knew that as a scientist and a physician, I could not 'prove' these experiences to be real," placing the word *prove* in quotation marks as if proof were little more than a semblance of reality. Instead, in the most fuzzy, New Age fashion, she speaks airily about "the wisdom and truths arising from these mysteriously beautiful experiences" (Amatuzio 2006, x).

Like everyone, she recognizes that we humans are cerebral and emotional creatures. We both think *and* feel. For example, we can scientifically prove the fact of death and investigate its cause on the one hand, and, on the other, we can respond to death with appropriate sadness for the deceased and compassion for that person's loved ones, among other emotional responses.

The problem lies in trying to *think* with our emotions. Not only does Amatuzio (2006, 181, 199–201) advocate trusting "intuition" as a means of "knowing" (as if intuition never fails!), but she attempts to make it seem intellectually respectable through pseudoscientific speculations about quantum physics and cell biology (137–140). Thus she concludes when we begin to "awaken"—to use intuition—"We see the truth about life and gain a deep knowing, a glimpse through the mysterious veil separating the living and dead. I believe in my heart, I *know*, that life goes on . . . forever" (200).

But does she not *know* what neurological science has established, that once the brain has been destroyed, brain function ceases? With that cessation ends the ability to think and move, no matter how much we want to believe otherwise. Ghosts—even headless ones (Nickell 2006)—may haunt people's imaginations, but there is no scientific proof that they otherwise exist.

Nevertheless, like a number of other New Age doctors—such as Judith Orloff (2000) who claims psychic ability and advocates "intuitive healing"—Amatuzio "knows" the "truth" of her beliefs. Although she is intelligent and scientifically trained, she has many of the traits associated with a fantasy-prone personality—one common to many "mediums," "psychics," and "visionaries." (So does Orloff: see Nickell 2004, 215.) That personality type was characterized in a pioneering study by Sheryl C. Wilson and Theodore X. Barber (1983) that identified some thirteen shared traits. (Anyone may have a few of these—I do—and only rarely would someone have all of them. As in previous studies [Nickell 2004, 296–303], I consider six or more traits in an individual indicative of fantasy-proneness. Called "fantasizers," such people are sane and normal, representing an estimated 4 percent of the population.)

Among the fantasy traits that Amatuzio exhibits are (1) *having imaginary companions in childhood* (she had "not one but two imaginary friends," named "Rara" and "Gerry" [4]); (2) *fantasizing frequently as a child* (with her "friends," for hours on end she "made up new games, fairy castles, and magic places" [4]); (3) *experiencing imagined sensations as real* (her imaginary friends and two stuffed animals "seem as real to me today as they did then" [6]); (4) *experiencing hypnagogic or hypnopompic hallucinations* (she describes a bedside visitation by "a large, light-filled being" [9]); (5) *receiving special messages from spirits, higher intelligences, or the like* (her "being" told her he was her "guardian and guide" [9]); (6) *having out-of-body experiences* (in one incident she has the sense of being "outside myself looking into the cadaver laboratory" [13]); and others.

I do not know if Amatuzio can see the obvious, that her spirit guide is merely a grown-up version of one of her childhood's imaginary friends. That the notion comforts her—just as her storytellers say their dreams and synchronicities give them peace—does not establish the existence of a spirit realm. Neither does it recommend that we believe in such, lured by doubtful—even often

disproved—evidence. To do so is to sacrifice reason on the altar of superstition, to be bewitched into coping with our real, natural world by embracing the fantasies of an unreal, supernatural one.

Note

1. For a discussion of forensic pathology see my *Crime Science* (Nickell and Fischer 1999, 246–268).

References

Amatuzio, Janis. 2002. *Forever Ours: A Forensic Pathologist's Perspective on Immortality and Living, a Collection of Real-Life Stories*. Minneapolis: Midwest Forensic Pathology.

———. 2006. Beyond Knowing: *Mysteries and Messages of Death and Life from a Forensic Pathologist*. Novato, California: New World Library.

Falk, Ruma. 1981. On coincidences, SKEPTICAL INQUIRER 6 (2) (winter): 24–25.

Hansel, C.E.M. 1966. *ESP: A Scientific Evaluation*. New York: Scribner.

Hill, Myron G., Howard M. Rossen, and Wilton S. Sogg. 1978. *Evidence*. St. Paul, Minn.: West Publishing.

Jung, C.G. 1960. Synchronicity: An acausal connecting principle, in *The Collected Works of C.G. Jung*; ed. Sir Herbert Read et al. Bollingen Series, no. 20. New York: Pantheon, 418–519.

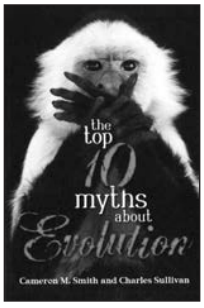
Nickell, Joe. 1999. *Crime Science: Methods of Forensic Detection*. Lexington, Ky.: University Press of Kentucky.

———. 2004. *The Mystery Chronicles: More Real-Life X-Files*. Lexington, Kentucky: University Press of Kentucky.

———. 2006. Headless ghosts I have known, *Skeptical Briefs* 16 (4) (December): 2–4.

Orloff, Judith. 2000. *Dr. Judith Orloff's Guide to Intuitive Healing*. New York: Times Books.

Wilson, Sheryl C., and Theodore X. Barber. 1983. The fantasy-prone personality. In *Imagery: Current Theory, Research and Application*, edited by Anees A. Sheikh, 340–387. New York: John Wiley & Sons.



Defending Evolution, but with a Cop-Out

KENNETH W. KRAUSE

The Top Ten Myths about Evolution. By Cameron M. Smith and Charles Sullivan. Prometheus Books, Amherst, New York, 2007. ISBN 13:978-1-59102-479-8. 200 pp. Softcover, $14.

True, nearly 150 years after Darwin published *On the Origin of Species*, about half of Americans still believe that humans and dinosaurs coexisted at some point in natural history. About half deny that people evolved from earlier species. True, if you mention the evolution of species outside of a laboratory or classroom, you might also hear a response along the line of, "I don't believe it! After all, I've never seen half a cat!"

So why should we care? Why not let people believe what they will? Because it's simply too late for that, answer educators Cameron Smith and Charles Sullivan. Socially, intellectually, scientifically, and technologically, we've come entirely too far to reverse course. Evolution is as critical to biology as electricity is to a pop-up toaster, and every citizen's basic comprehension of biology is prerequisite to her ability to effectively confront crucial issues such as disease prevention, environmental protection, the safety of endangered species, stem-cell research, genetic engineering, and so on.

So how to begin? Perhaps with *The Top Ten Myths about Evolution*, suggest Smith and Sullivan. *Top Ten Myths* has been impressively researched, thoughtfully documented, and generally well written. Although each chapter has at least something important to say, or to repeat, as the case may be, more informed readers might find the observations and insights tucked away in the generous endnotes more stimulating. On the whole, Smith and Sullivan have managed to tender something challenging for some and valuable for all.

For instance, following a critique of the "myth" that evolution is "just a theory," the authors relate not only the bare distinction between Darwin's original theory and neo-Darwinism (or the *modern synthesis*) but also the somewhat more obscure facts surrounding Darwin's *pangenesis* hypothesis. Oblivious to the genetic basis of natural selection, Darwin seriously considered the possibility that traits acquired during an organism's lifetime could be passed along to its offspring. Tiny particles called *gemmules*, he speculated, would penetrate an organism's sex organs, adding to its cache of reproductive information. If nothing else, this brief discussion highlights the provisional nature and thus unparalleled dynamism of all science.

More predictably, *Top Ten Myths* delivers a polemic that, although factually appropriate, often borders on the needlessly apologetic and, in the end, the intellectually disingenuous. Throughout the text, the authors defend evolution by one means or another against the teleological "Great Chain of Being," the *Scala Natura*, or its persistent remains, apparently presuming a religious but theologically manipulable audience.

The medieval Great Chain classified all things hierarchically, from the strictly material (rocks, for example) to the purely spiritual (angels, archangels, and, of course, God). All living things were fixed according to the seamless plan of a perfect creator. The scheme infested more than religion, however, influencing Lamarck's conclusion, as well, that species eventually progressed up the Chain as a result of each member's lifetime achievement. Smith

Kenneth W. Krause is a former prosecutor and criminal defense attorney with degrees in law, history, literature, and fine art. Books editor for Secular Nation*, he has recently contributed as well to* Free Inquiry*,* Skeptic*,* SKEPTICAL INQUIRER*, and* The Humanist.

and Sullivan effectively rebut the mistake of progress by noting that bacteria, rats, and cockroaches are, and will likely always be, among the most successful species on earth, and by reminding us that some organisms, internal parasites and cave-dwelling fish included, have actually grown less complex over time. Similarly, the authors call attention to the metaphysical inconsistency of inferring an evolutionary purpose from a planet that has experienced at least five mass extinctions in the last 440 million years.

Because the Chain implied permanently distinct and easily identifiable species, its legacy frequently seduces modern religionists into an exaggeration of the fossil record's "missing links," or alleged want of transitional forms. Such gaps, of course, can be explained in a number of ways. No doubt every naturally abrasive force from tectonic shift and vulcanism to simple erosion can be blamed to some extent. But not every organism can fossilize, especially those with soft bodies. And those that can fossilize must surrender themselves at the right time under opportune circumstances in order to do so. Bones, teeth, and shells will suffice, assuming a sedimentary environment, but even they will most often fragment, crumble, and deteriorate long before they can fossilize.

As for the "half-a-cat" quandary, species classification is not, and perhaps will never be, a visually or conceptually satisfying—much less an exact—science. Although speciation is considered a function of reproductive isolation, the authors point out that, for example, lions and tigers can mate and, at least in captivity, produce baby "ligers" or "tigons" (whichever name you prefer). Genetically, they are considered one species but, behaviorally, lions and tigers are diverse enough to merit separate classification. Regardless, kitties became kitties very slowly, over greater spans of time than human brains have evolved to contemplate, much less comprehend in any meaningful way. And, although cats are always changing, their genes forever drifting and adapting, it is certainly true that one will never witness a creature that is half cat and half something else. So be it.

But so-called "missing links" have been found, between fish and amphibians, amphibians and reptiles, and reptiles and mammals. The remains of *archaeopteryx*, for example, revealed a crow-sized creature sporting both bird and lizardlike features. We have located, as well, the fossils of warm-blooded reptiles called *therapsids* and of many transitional species leading from *eohippus* to the modern horse. And, time and again, we have unearthed the fossils of our own ancestors that are neither *Homo* (of the human genus) nor *Pan* (of the chimpanzee genus), but rather *Australopithecus* (meaning southern ape): large, bipedal, African hominids with relatively small brains, the earliest members of which lived four to six million years ago, when they diverged from forest-dwelling chimp and gorilla-like primates. These creatures separated into two groups: the *robusts*, which died out about one million years ago, and the *graciles*, which might have been our ancestors. Lucy, in fact, was a 3.2-million-year-old *australopithecine* discovered in Ethiopia in 1974.

The Great Chain, of course, has most recently culminated in the unfortunate doctrines of creationism and its thinly veiled cousin, intelligent design. Smith and Sullivan devote a chapter to each, adequately exposing them as blunt but effective tools of religious desperation. In the process, however, the authors draw an unhelpful distinction between philosophical and methodological naturalism, the former rejecting anything that purportedly cannot be explained by natural laws and the latter withholding all possible judgment in that regard. In the end, they observe, science has nothing to say about gods and souls so long as we assume such things are not part of the physical world. And belief in God (yes, "God" with a capital, monotheistic, Abrahamic "G"), the authors vie, "is not incompatible with evolution or science in general" (p. 145).

. . . so-called "missing links" have been found, between fish and amphibians, amphibians and reptiles, and reptiles and mammals.

Belief without and, in fact, impervious to evidence is not incompatible with science? Such is either the mother of all politically convenient cop-outs or unmistakable confirmation that the Great Chain's influence persists, at least with respect to its preposterously naïve segregation of humanity and its God. Moreover, we simply cannot assume, as much as we might like to, that God and his alleged carryings on are not part of the physical world. To the contrary, the Abrahamic texts make it painfully, brutally, *agonizingly* clear that God has supposedly had a great deal to do with us and our planet. As Smith and Sullivan had at least begun to say, we simply can't afford to continue to offer these kinds of compromises.

The Nonsense and Non-science of Sasquatch

BENJAMIN RADFORD, MICHAEL R. DENNETT, MATT CROWLEY, AND DAVID J. DAEGLING

Sasquatch: Legend Meets Science. By Jeff Meldrum. Forge Books, New York, 2006. ISBN 0-765-31216-6. Hardcover, $27.95.

Editor's note: This review is composed of analyses by four noted researchers of Bigfoot claims, each of whom was asked to briefly critique the book on their areas of expertise.

That which appears to be scientific, or has the veneer of science but is not, is called *pseudoscience*. Pseudoscience can take many forms, and is often found in areas of study in which there is little hard evidence for a given phenomenon. Real science uses scientific methods, standards of evidence, critical analysis, and so on. The pursuit of free energy, aliens, ghosts, and psychic powers, just to name a few, are rife with pseudoscience, nonscience, and nonsense.

Enter the pinnacle of the scientific argument for Bigfoot: Jeff Meldrum's new book titled (without a trace of irony) *Sasquatch: Legend Meets Science*. Meldrum, who holds a PhD in anatomical sciences, is an associate professor of anatomy and anthropology at Idaho State University. With the 2002 death of anthropologist Grover Krantz, Meldrum assumed the mantle as the highest-profile scientist publicly investigating Bigfoot.

Meldrum's expertise, according to the book's foreword, is "human locomotor adaptations;" he is certainly qualified to speak about anatomy, but how that applies to Bigfoot—an animal never proven to exist—is unclear. Since we have no Bigfoot body for Meldrum to apply his real-world expertise to, he is reduced to being an armchair analyst for the Zapruder film of Bigfootery, the famous film shot in 1967 by Roger Patterson. The problem for Bigfoot proponents is that the film is an evidentiary dead end. Like any number of other ambiguous photos, films, videos, and images, it is simply a pattern of colors on a two-dimensional medium and cannot yield a shred of hard evidence or conclusive information about Bigfoot.

Meldrum often fails to seriously consider alternative explanations, a serious scientific misstep. Throughout the book, he focuses on theories that support his position while ignoring (or giving short shrift to) competing skeptical theories. Whether intentional or the result of the book's production deadlines, some parts of *Sasquatch* are simply incomplete and outdated. For example, Meldrum does not include a thorough and devastating analysis by Anton Wroblewski showing that the much-touted Skookum cast imprint was most probably created by a kneeling elk—complete with a photograph showing an elk in just such a position. And *Sasquatch* fails to include a serious discussion of the evidence that at least some Bigfoot dermal ridges may be casting artifacts. (Though from the tone of the book it seems unlikely that these careful skeptical analyses would have been objectively evaluated and discussed.)

Meldrum was apparently not happy with Benjamin Radford's SI overview article "Bigfoot at 50." Among other issues, Meldrum chides Radford for quoting "unqualified individuals" and "amateur investigators" as if they were authorities—researchers such as Rene Dahinden, Loren Coleman, Grover Krantz, Rick Noll, Richard Greenwell, Dave Daegling, John Napier, and others who have written widely on the topic. Curiously, Meldrum himself repeatedly quotes the very same unqualified amateurs throughout *Sasquatch: Legend Meets Science*.

Another of Meldrum's criticisms actually highlights the fundamental flaw in his book: a lack of scientific expertise. Meldrum writes, "The majority of those [Bigfoot] critics . . . have limited expertise to evaluate the diverse evidence—e.g., footprints, hair, scat—with a degree of competence or authority. Indeed, precious few qualified scientific researchers have made any serious attempt to . . . evaluate the data." Since that scientific expertise is the book's subtitle and calling card, it merits a closer look.

While Meldrum congratulates himself and his fellow "qualified scientific researchers" for their academic bravery and expertise in tackling the Bigfoot issue, he fails to recognize that real science (as opposed to pseudoscience) operates on good evidence. There simply isn't good, hard evidence for Bigfoot. Meldrum is like a chef with bare cupboards, promising to show his expertise when the food arrives but in the meantime forced to talk idly about how sharp his knives are.

Meldrum appoints himself the sole judge of who is qualified to critique Bigfoot evidence, yet fails to look closely at

Benjamin Radford has investigated Bigfoot and other mysteries for over a decade; his latest book is Lake Monster Mysteries. *Michael Dennett, a longtime observer of the Bigfoot phenomena, has investigated and written about the Bermuda Triangle, UFOs, lake monsters, and so-called psychic sleuths. Matt Crowley previously worked as a pharmacist, sideshow performer, lamp builder, and is now a certified welder. He has spoken at several Sasquatch conferences on the topic of "Dermal Ridges and Casting Artifacts." David J. Daegling is an associate professor of anthropology at the University of Florida. His is the author of* Bigfoot Exposed *(2004, AltaMira Press).*

his own scientists. Experts discussing matters outside of their expertise is one hallmark of pseudoscience, and *Sasquatch* offers several instructive examples. For example, Meldrum quotes a Dr. Lynn Rogers on the subject of eyewitness testimony. Rogers, Meldrum states, considers the likelihood of mistaking a bear for a Sasquatch "possible but unlikely." This seems compelling until you note that Dr. Rogers is a bear biologist, not a cognitive psychologist and therefore has no particular expertise about the real issue, which is not ursine morphology but the reliability of perception and eyewitness identification. One wonders if Jeff Meldrum consults his auto mechanic when he gets a toothache.

Meldrum later quotes Dr. Henner Fahrenbach, "who has published a statistical analysis of reported Sasquatch dimensions" based on a collection of stories and anecdotes that Meldrum himself admits "may or may not be credible"(!). Meldrum passes off Dr. Fahrenbach's pseudoscience as valid research, hoping readers won't notice that Dr. Fahrenbach is not a statistician but instead a retired microscopist, a field of expertise with little or no relevance to the type of analysis he performed. (More to the point, despite Meldrum's puzzling claim that "anecdotal data forms the basis for many valid statistical analyses," the jumble of stories Fahrenbach analyzed is *prima facie* poor data, rendering his conclusions virtually worthless; as the saying goes, garbage in—garbage out. It is troubling and puzzling that Meldrum, a scientist as he keeps reminding us, doesn't realize this.)

—Benjamin Radford

* * *

Sasquatch Hoaxing

Jeff Meldrum accepts "evidence" produced by Paul Freeman, an admitted hoaxer of Bigfoot footprints, as a basis for proof of Bigfoot. Recounting the fact that some of Freeman's Sasquatch "hair" samples turned out to be man-made fibers, he says

> On the surface, this appears to be a clear-cut case of hoaxing. However, others, including a retired game warden, have also discovered suspicious hair that likewise turned out to be similar synthetic fibers. It has been suggested that these resilient fibers have become something of a pervasive environmental contaminant, although the extent of this has not been determined. It should be noted that Freeman has collected several samples of true hair that number among Fahrenbach's collection of possible Sasquatch hair, including samples from which degraded DNA was extracted by researchers at Ohio State University. It seems unjustified to throw out all the evidence as a result of a case of misidentification." (p. 267)

This is not the only mention of Freeman evidence in the book. On Meldrum's first unannounced meeting with Freeman, he says he tried to "size up the person, his reliability and motivations." Then (even to Meldrum's surprise) Freeman said, "Would you like to see some fresh tracks? I just found the first tracks of the spring earlier this morning." Meldrum went for the bait and was shown a series of many tracks that he determined could not be faked (p. 23–24). By the date of this incident (ca. 1996), Freeman had been associated with many items of hoaxed or suspect Bigfoot evidence extending over a decade, and in fact many Bigfoot researchers independently regarded Freeman as a hoaxer based on nearly identical encounters.

As a "credentialed scientist" Meldrum implies he cannot be fooled. So when Paul Freeman produced an eight-inch-wide Sasquatch handprint showing a creature with a "non-opposable thumb" (p. 110) he did not see this as evidence of a hoax. Instead, Meldrum states that the human opposable thumbs permit a "precision grip" that appears to have been refined "relatively late in human evolution," a fact that is correlated with the progressive sophistication of tool manufacture," and therefore Sasquatch branched from the primate line before this adaptation.

Michael Dennett was struck by the similarity between Sir Arthur Conan Doyle and his commitment to spiritualism and Meldrum's handling of Bigfoot "evidence." Even when mediums were caught faking spirit manifestations, Doyle would not acknowledge this and persisted in his belief despite clear and contrary evidence.

Just as Doyle found evidence for ghosts, Meldrum finds evidence of Sasquatch almost everywhere. On a Bigfoot expedition in 1997, he recounts, "As I slung my pack off, a softball-sized rock sailed onto the trail a mere few feet away. There was no high point nearby from which a rock might have been dislodged by the rainstorm. Nor did it simply roll onto the trail from uphill. It had been airborne; it had been lobbed. For the first time on this excursion the hair on my neck stood on end; there was that subjective, but inescapable sense of being watched" (p. 31). For Doyle, this tale would have been proof of spirit manifestations. A more contemporary view would have identified the rock toss as a classic poltergeist event, not evidence for Sasquatch.

Meldrum's book raises the art of omission and cherry-picking data selection to great heights. One example is his reference to dermal ridges and valleys (fingerprints) found on a footprint cast. Fingerprint examiner Edward Palma is quoted as saying the dermals couldn't be faked, and furthermore, "Palma was able to trace the ridge pattern over the entire breadth of the forefoot" (p. 252). Meldrum does not tell the reader the cast is yet another Paul Freeman "find," nor does he mention that this track is almost certainly a hoax and that even some Bigfoot proponents believe it fake. Significantly, he fails to tell his readers that, according to the late Grover Krantz in his 1992 book *Big Footprints,* Ed Palma examined a Bigfoot cast from Bloomington, Indiana, and he "pronounced the several patches of ridge detail as consistent with a real primate foot," (Krantz p. 84). Furthermore, the Bloomington print was "examined by

the tracker Bob Titmus, and fingerprinter Ed Palma, the two best experts available, and they both thought it looked genuine" (Krantz p. 200). The Bloomington track was later revealed as a fake intended to demonstrate how Krantz and his "experts" could be fooled.

But perhaps the most deliberate example of omission is the findings of another Bigfoot proponent, fingerprint expert Jimmy Chilcutt. Chilcutt had also examined this Freeman cast and dismissed it as evidence for Sasquatch commenting the "casting had been enhanced manually with a human fingerprint." Some might excuse this omission if Meldrum disagreed with Chilcutt, but less than two pages later he presents Chilcutt as an expert on Sasquatch dermal ridges!

—Michael R. Dennett

* * *

Dermal Ridges

One of the main pieces of evidence for the claim that Bigfoot tracks exhibit dermal ridges is the "Onion Mountain" footprint, a thirteen-inch cast made by researcher John Green in Northern California in August 1967. An additional set of tracks, the "Wrinkle Foot" casts, allegedly also display similar ridge patterns. The Wrinkle Foot set of prints were discovered by Paul Freeman. Photographs of the Onion Mountain and Wrinkle Foot casts appear on opposite pages of Meldrum's book, and so allow for an easy comparison. Though all three casts are the same length, it's obvious they are markedly different in shape, yet both foot shapes are included as some of the best evidence for Bigfoot's existence.

On May 29, 2005, Matt Crowley spoke at a Sasquatch conference in Bellingham, Washington, claiming that the unique surface textures of the Onion Mountain cast had a prosaic explanation; they were "casting artifacts." Basically, textures that closely resemble dermal ridges can sometimes spontaneously form on cement casts when the casts are made in very fine, dry soils, like those in which John Green found his tracks. The ridges that spontaneously form somewhat resemble the sand patterns that form on shallow beaches after the tide has gone out. In a surprising turn of events, Meldrum himself publicly proclaimed this hypothesis a "slam dunk." Unknown to Crowley at the time, Meldrum had previously made test casts in fine Idaho loess soil that also exhibited casting artifacts.

Perhaps not surprisingly, Meldrum's current treatment of the Onion Mountain cast in his book is something of a retrenchment from his "slam dunk" proclamation. If the casting artifact hypothesis is correct, then Chilcutt's claim that the textures must represent Bigfoot's dermal ridges is wrong, and rather spectacularly so. Indeed, Chilcutt previously set the stakes for himself very high, when he claimed (on the 2003 "Sasquatch: Legend Meets Science" documentary) that he would "stake his reputation" on his dermal ridge interpretation.

The provenance and chain of custody of the Onion Mountain cast is even more fundamentally damning for Meldrum's current position. What he claims is the original cast has clearly written "Onion Mountain" in ink on the cast itself. Yet until presented with evidence in the form of an e-mail from John Green, Chilcutt maintained that the cast had come instead from Northern California's Blue Creek Mountain (see www.normalpeoplelikeyou.com/article_assets/sasquatch.htm). It is not clear that Chilcutt even examined the cast that Meldrum claims is the original. If he did, why didn't he use the unique, unambiguous nomenclature of "CA-19," especially when multiple casts were made of that trackway? This would seemly be an obvious procedure for a veteran crime scene investigator such as Chilcutt.

Unfortunately for Bigfoot advocates, the situation is even more chaotic. John Green claims the original cast is lost. Thus the very provenance and chain of custody of a cast which Chilcutt has previously referred to as "the best one with the clearest dermal ridges" (see www.normalpeoplelikeyou.com/article_assets/sasquatch.htm) is in dispute. If this sort of "scientific evidence" was used in a legal trial, police detectives would be laughed out of court with such sloppy science and careless protocols. Yet this is typical of the evidence Meldrum and others proffer for Bigfoot.

Incredibly, a recent claim by Bigfoot advocate Rick Noll casts further doubt on the situation. Noll claims that John Green and Bob Titmus regularly scrubbed "surface imperfections" off of their casts with *wire brushes* (see www.bigfootforums.com/index.php?s=&showtopic=16414&view=findpost&p=346703). If so, this calls into question the wisdom of Meldrum's advocacy of yet *another* dermal ridge cast, one made by Bob Titmus in 1963.

As forensic or scientific evidence for Bigfoot's dermal ridges, the Onion Mountain cast is tainted at the very root and so falls short of even minimum standards of what is considered scientific evidence. Because Meldrum selectively presents his experts and evidence, there is no hint in *Sasquatch* of the many problems associated with the dermal "evidence." In view of Meldrum's familiarity with—and acceptance of—Crowley's experiments demonstrating serious problems with a cornerstone of dermal ridge evidence, his chapter on this topic is inexplicable.

—Matt Crowley

* * *

The Fossil Record

In *Sasquatch: Legend Meets Science*, Jeff Meldrum suggests that Bigfoot arrived in the New World via the Bering land bridge. His hypothesis that Bigfoot represents the descendants of the Asian *Gigantopithecus* has the veneer of plausibility, until one remembers that there is material evidence of a parallel migration by humans all over the North American continent, where we have not a single *Gigantopithecus* fossil.

Meldrum is committed to the idea that the absence of Bigfoot fossils is not

only unproblematic, but actually unsurprising, given the geographic circumstances of the giant's supposed migration route and habitat. The reason we have no bones, he explains, is that many if not most Bigfoot fossils are now buried at sea due to recent rises in sea level, and those bones remaining on dry land have been destroyed by the acidic soils of the Pacific Northwest (p. 103). These speculations might be persuasive except for the small detail that we have plenty of fossils preserved in sediments of the Pacific Northwest that postdate Bigfoot's arrival.

The 1967 film of Bigfoot is defended by several assertions that are impossible to evaluate based on material in the book itself. Most incredible is the application of "reverse kinematics" to the film in which the three-dimensional movements of the film subject's skeleton are reconstructed from the film's two-dimensional images. How this is even theoretically—let alone methodologically—possible is never explained, but the reconstruction Meldrum champions is more clearly the result of imagination than credible forensic analysis. Meldrum recycles the argument that the film subject is too large to be a human in a costume, alternatively asserting and denying that it is possible to extract accurate absolute dimensions from the film. This might explain why he insists there is a reliable way to estimate subject height from the film, yet never manages to settle on a specific figure for stature. Some of the arguments become fantastically convoluted: to demonstrate that the filmed Bigfoot has a bulkier thorax than any living human (p. 163–164), Meldrum argues—based on concern over the instruments used to take measurements—that one must compare width of the back of the film subject with standardized measures of human chest width taken from the front *at a different location*. Doing this, Bigfoot indeed appears superhuman, an unsurprising result since thorax dimensions at these two locations differ within individuals! (See *Anthropometry and Mass Distribution for Human Analogues*, 1988, currently archived at www.smf.org/articles/hic/USAARL_88-5.pdf.)

Other claims, such as the exposure of muscular herniations or the dynamics of the Achilles tendon, are made without serious consideration of alternative interpretations involving film artifacts or expected costume effects. Meldrum claims that one sequence in the film shows midfoot flexibility in the film subject—considered a hallmark Bigfoot trait. The image recruited to support this claim is blurred and critical parts of the foot are actually obscured, but what would it mean if one could see this trait? A foot placed in an oversized, flexible furry shoe might show exactly the same thing. Pareidolia—the viewing of a vague stimulus yet seeing something distinct within it—is as likely an explanation for these intricate anatomical observations.

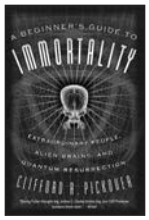
Meldrum's most original contribution to Bigfoot research is his claim that footprints (and the 1967 film) provide evidence that Bigfoot possesses a flexible transverse tarsal joint, a condition strikingly distinct from the fixed arch pattern of modern human feet. The evidence for this is that some Bigfoot tracks display pressure ridges along the middle of footprints that betray this joint's position. If this trait is to be considered diagnostic, it follows that (1) other nonhuman primates having this feature can produce similar tracks; and (2) neither human feet nor phony Bigfoot feet have this ability. Meldrum explores neither premise. In fact, some human prints mimic this condition (a trip to a crowded beach confirms this), and bogus Sasquatch feet can produce this effect as well.

In sum, *Sasquatch: Legend Meets Science* desperately needed a logician and a psychologist. Among Meldrum's parade of PhD experts we find few with any real expertise in the issues at hand, nor even a scientific approach. Meldrum is an anatomy expert, but his analysis of a forty-year-old Bigfoot film, as detailed and superficially impressive as it is, has little to do with real anatomy.

As the examples above show, there is precious little science in the search for Bigfoot, and even less in *Sasquatch: Legend Meets Science*. The top scientist searching for Bigfoot is unable or unwilling to distinguish good research from bad, science from pseudoscience. If *Sasquatch: Legend Meets Science* is in fact the best, most credible, and most scientific book to date on Bigfoot, the evidence is weaker than we imagined. The book's copious photos, diagrams, and charts will likely impress lay readers with little understanding of the issues or the scientific methods, but those looking for a thorough, scientific analysis will be disappointed.

—David J. Daegling □

Listing does not preclude future review.

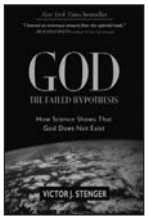


A BEGINNER'S GUIDE TO IMMORTALITY: Extraordinary People, Alien Brains, and Quantum Resurrection. Clifford A. Pickover. Thunders Mouth Press, New York, 2007. 322 pp. Softcover, $15.95. The latest book by prolific author (and occasional SKEPTICAL INQUIRER contributor) Clifford Pickover, *A Beginners Guide to Immortality* surveys dozens of topics loosely connected around themes of creativity, consciousness, immortality, and near-death experience—often with references to pop culture. With such a wide range of topics, the book is a difficult one to adequately describe, but perhaps one example will suffice: in a section titled "The Religious Implications of Mosquitoes," Pickover discusses the implications on evolution of the discovery of a potentially new species of mosquito that evolved in the London subway system. The book is liberally sprinkled with quotes (some more insightful than others) by everyone from Robert Green Ingersoll to Truman Capote and Woody Allen. Each of the sections ranges from a few paragraphs to a few pages; readers looking for more in-depth treatment will find the notes and references quite helpful. — *B.R.*

MADONNA OF THE TOAST. Buzz Poole. Mark Batty Publisher, New York City, 2007. 95 pp. Softcover, $14.95. *Madonna of the Toast* is about pareidolia, the psychological phenomenon of finding meaning in random and presumably ambiguous patterns. Typical examples include faces in clouds and cliffs (New Hampshire's state quarter features a well-known face), but, as SKEPTICAL INQUIRER readers know, images both sacred and profane can be found in water stains and tree trunks. The book is divided into secular sightings (such as Mickey Mouse's head seen in a cow's spots) and forms of faith (including not only the famous "Madonna Grilled Cheese" but also the lesser-known "Jesus Pierogi"). Author Buzz Poole adopts an informative and humorous approach to the subjects. And why write a book about potato chips that resemble Bob Hope? "The objects in this book, emblazoned with faces and symbols recognized the world over, have been appraised at stunningly high sums, have been toured around the globe and have inspired people to travel, pray, and steal." — *B.R.*

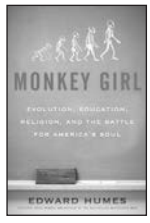
TALL TALES ABOUT THE MIND AND BRAIN: Separating Fact from Fiction. Edited by Sergio Della Sala. Oxford University Press, New York, 2007. 509 pp. Softcover, $57.50. Sergio Della Sala, the editor who brought us *Mind Myths: Exploring Popular Assumptions About the Mind and Brain* in 1999, is at it once again with a new collection of articles, studies, and essays about the mind. Topics include eyewitness testimony, intuition, graphology, the psychology of anomalous experiences, the so-called Mozart Effect on babies' brains, phantom limbs, sleep paralysis, and cold reading. Contributors include Ray Hyman, Barry Beyerstein, Elizabeth Loftus, David G. Myers, and Peter Lamont. Some of the material appeared previously in the pages of SKEPTICAL INQUIRER, and the book is a good resource for those interested in the psychological principles that often underlie unexplained or mysterious phenomena. — *B.R.*

AN ILLUSION OF HARMONY: Science and Religion in Islam. Taner Edis. Prometheus Books, Amherst, New York, 2007. 250 pp. Hardcover, $28. Edis, a native of Turkey and an associate professor of physics in the United States (Truman State University), examines the range of Muslim thinking about science and Islam, from blatantly pseudoscientific fantasies to comparatively sophisticated efforts to "Islamize" science. He says popular Muslim approaches promote a view of natural science as a mere fact-collecting activity that coexists in near-perfect harmony with literal-minded faith. Edis finds that current arguments in the West about the relation of science and Judeo-Christian religion are paralleled in the Islamic world. Much popular writing in Muslim societies asks such questions as "Is Islam a 'scientific religion'?", "Were the discoveries of modern science foreshadowed in the Quran?", and "Are intelligent design conjectures more appealing to the Muslim perspective than Darwinian explanations?" — *K.F.*



GOD, THE FAILED HYPOTHESIS: How Science Shows That God Doesn't Exist. Victor J. Stenger. Prometheus Books, Amherst, New York, 2007. 294 pp. Hardcover, $28. In a book heartily endorsed by both Richard Dawkins and Sam Harris, physicist and author Victor J. Stenger (University of Hawaii and University of Colorado) takes up the same theme they do in their recent best-selling books but from even more of a hard-nosed physical sciences viewpoint. If God exists, he contends, some evidence for this existence should be detectable by scientific means. He shows that a number of proposed supernatural or nonmaterial processes are empirically testable using standard scientific methods; also, that the God hypothesis implies certain natural, material phenomena that are *not* observed. After evaluating all this evidence (and non-evidence) he concludes that beyond a reasonable doubt the universe and life appear exactly as we might expect if there were no God. — *K.F.*

FORTY DAYS AND FORTY NIGHTS: Darwin, Intelligent Design, God, OxyContin, and other Oddities on Trial in Pennsylvania. Matthew Chapman. Collins/HarperCollins, New York, 2007. 280 pp. Hardcover, $25.95. Matthew Chapman is Darwin's great-great-grandson and a screenwriter and director. He spent several months covering the *Kitzmiller v. Dover Board of Education* trial in Pennsylvania from beginning to end. This is his first-person report (the title refers to the trial's length). Chapman, who had a troubled childhood and came to America in the 1980s due to his hatred of the English class system, ironically didn't know much about evolution himself until he wrote a book in 2001 about the Scopes trial. Now he's become concerned about credulous acceptance of hoaxes and pseudoscience and about the zealotry of the evangelical anti-evolution movement. Nevertheless, he thinks creationism should be allowed in the classroom, if only to subject it to the kind of devastating critical scrutiny it got in the trial. — *K.F.*



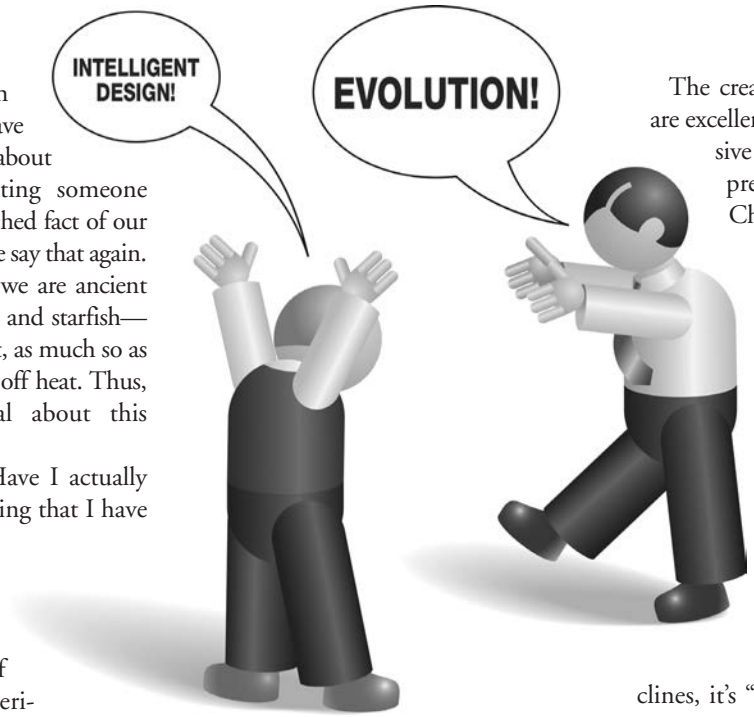
MONKEY GIRL: Evolution, Education, Religion, and the Battle for America's Soul. Edward Humes. Ecco/HarperCollins, New York, 2007. 380 pp. Hardcover, $25.95. Pulitzer Prize winning journalist Edward Humes tells the story of the *Kitzmiller v. Dover Board of Education* science versus intelligent design trial in Pennsylvania. All the trial's key participants and associated characters are here, some with backstories, and much of the testimony, all woven into a fine, readable whole by Humes. The book provides a fascinating illumination of the collisions of science, religious zealotry, and politics. An epilogue charts events since Judge John Jones's eloquent ruling in December 2005 that ID is not a science and the teaching of it in schools a clear violation of the Constitution. The publisher's release about this book includes a clear series of statements debunking typical creationist arguments against evolution. — *K.F.*

—Kendrick Frazier and Benjamin Radford

Debating Creationists

I was asked by the Anthropology Club at Long Beach City College to debate a scientist from the Discovery Institute regarding intelligent design. These were my opening remarks.

CHARLES L. RULON



I want to be up front with all of you today. I have very mixed feelings about being here—about debating someone who still rejects the established fact of our biological evolution. Let me say that again. Evolution—meaning that we are ancient cousins of apes and whales and starfish—is a scientifically settled fact, as much so as the fact that our sun gives off heat. Thus, there's something surreal about this debate.

So, why am I here? Have I actually deluded myself into thinking that I have some silver bullet arguments to convert the creationists in today's audience? Hardly, as I discovered from decades of frustrating personal experiences. The only way creationists have been defeated, so far, from introducing their anti-evolution beliefs into public school science classes has been in court cases where their phony science has been exposed.

So, again, why am I here today? Because I believe that science educators have a duty to defend the scientific method from irrational attacks. I also feel a moral obligation toward those in the audience who are still undecided—those whose minds haven't already been snapped shut by anti-evolution religious dogmas. I feel strongly that the fake science of the creationists must not be imposed on captive students in our public schools. That's why I agreed to debate today. Even so, there are excellent reasons for science educators to *not* debate the anti-evolutionists.

First, in science's search for truth, it's the rigorous application of the scientific method that counts, not oratory skills. Yet, repeatedly, the overwhelming majority of debates before public audiences are won *not* by the actual scientific content but by the emotional rapport, public speaking skills, likeability, and believed authority of the debaters. How could it be otherwise, given the audience's lack of expertise in being able to recognize fake science?

The creationists know this and most are excellent debaters, now with impressive and entertaining PowerPoint presentations. In fact, several Christian fundamentalist colleges are now churning out lawyers and other graduates who are highly skilled in debating and in defending conservative Christian "science."

A second reason for not debating is that there is no such thing as bad publicity for the creationists. If a scientist debates, it's "proof" that a scientific controversy actually exists. If he declines, it's "proof" that evolutionists are running scared.

Let's not kid ourselves. Regardless of superficial scientific appearances, intelligent design was fabricated by a handful of Christian apologists with the mission of discrediting evolution and of bringing conservative Christian values into

Charles L. Rulon is a professor emeritus of Long Beach City College, where he taught in the Life Sciences Department for thirty-four years. He has spent the last four decades lecturing and writing on the subjects of evolution, creationism, science and religion, the Christian Right, pseudoscience, abortion, and environmental issues.

public school classrooms. The scientific evidence for evolution is ultimately irrelevant to the faithful, since their "truths" come straight from God.

A third reason for not debating today is that creationists can churn out more scientific misinformation in thirty minutes than I could possibly refute in a week, as I've personally discovered. Creationists know that the student audience does not have the necessary expertise in evolutionary biology, historical geology, anthropology, and paleontology to be able to separate out scientifically solid evidence from half-truths, poor logic, outdated references, misleading quotations, selective data, and outright falsehoods.

A fourth reason for not debating creationists is that in debates equal time is given to both sides. Yet, the scientific method is *not* about equal time but about the rigorous evaluation of *all* the evidence on *all* sides. To require science teachers to "teach the controversy," to give equal time to evolution and ID is, in essence, to require teachers to lie to their students. Unfortunately, this appeal for equal time has been an effective propaganda tool for the creationists for decades. Many powerful politicians continue to support these efforts.

A fifth reason for not debating creationists is that these debates are also publicity stunts to increase the membership of Christian clubs on campuses. Such clubs now number in the tens of thousands. Most are spreading falsehoods regarding evolution, thus creating serious obstacles to the ongoing science education of students. Remember, anti-evolutionists are also trying to convince students to reject large chunks of well-established physics, chemistry, astronomy, anthropology, and geology.

To make matters worse, most of these Christian clubs also hold religious beliefs that can seriously interfere with rational, compassionate, and scientifically informed decisions related to other vitally important areas such as emergency contraceptive pills, the abortion pill, gay rights, death with dignity, and overpopulation.

And then there's the extremely scary Armageddon theology belief currently held by millions of Americans. After all, why be concerned about destroying our planet's life-support systems when the destruction of the world is already inevitable as foretold in Scripture?

Today the United States is being confronted with large numbers of scientifically ignorant, politically active Christians who are locked into ultra-religious, anti-scientific views and who want to force these views on others through our elected officials, our courts, and our schools. That's why I'm here today. □

The Future of Naturalism

September 20–22, 2007 • Center for Inquiry/Transnational, Amherst, N.Y.

Cosponsored by the Center for Inquiry/Transnational and the University at Buffalo Philosophy Department, with support from the C.S. Peirce Professorship in American Philosophy, the Marvin Farber Memorial Fund, and the George F. and Celeste Hourani Memorial Fund

Naturalism has achieved a dominant place on the world's intellectual scene, elevated by science's spectacular achievements. The philosophical effort to grapple with the wider implications of the scientific worldview must keep pace with science's ceaseless advances. Philosophical naturalism must understand both the power and limitations of scientific methodology. Can science realistically describe nature's workings, progressively expand our knowledge through intellectual revolutions, integrate the human being into nature, and help guide the quest for improving the human condition? The future of naturalism will ultimately depend on the answers to such questions, and this conference on The Future of Naturalism brings together many leading thinkers who are working on them. Speakers will discuss many crucial topics, including science's claims to know reality, how mind and experience might fit into nature, the implications of naturalism for ethics and law, the conflicts between religion and naturalism, and the varieties of naturalism.

Scheduled speakers

John Peter Anton (University of South Florida), Akeel Bilgrami (Columbia University), Arthur Caplan (University of Pennsylvania), Randall Dipert (University at Buffalo), Paul Draper (Purdue University), Owen Flanagan (Duke University), Ronald Giere (University of Minnesota), James Gouinlock (Emory University), Adolf Grünbaum (University of Pittsburgh), Terry Horgan (University of Arizona), Hilary Kornblith (University of Massachusetts), Paul Kurtz (Center for Inquiry), John Lachs (Vanderbilt University), Brian Leiter (University of Texas), Isaac Levi (Columbia University), Joseph Margolis (Temple University), Lynn Hankinson Nelson (University of Washington), Laura Purdy (Wells College), Nicholas Rescher (University of Pittsburgh), David Rosenthal (City University of New York), John Ryder (State University of New York), Charlene Haddock Seigfried (Purdue University), Harvey Siegel (University of Miami), John E. Smith (Yale University), Ernest Sosa (Brown University), Victor J. Stenger (University of Hawaii), Michael Tye (University of Texas)

Visit the conference's Web site at www.naturalisms.org/2007

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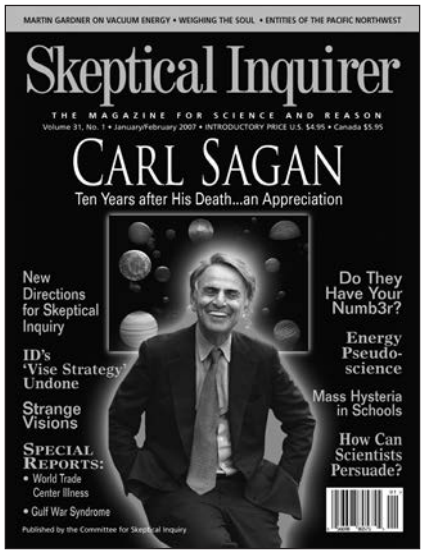
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Name Change, New Directions

Regarding the name change and new directions ("It's CSI Now, Not CSICOP," by Kendrick Frazier and the Executive Council, SI, January/February 2007): congratulations. This reexamination was long overdue and, indeed, good scientific practice.

I have been a subscriber to SKEPTICAL INQUIRER since its inception and, before that, subscribed to *The Zetetic*.

In discussion with people taken in by poorly examined "New Age" notions about nutrition, medical and mental-health quackeries, etc.—the list is long—I often hear the opinion that skeptics and promoters of science are arrogant, stiff-backed, dogmatic, overly rigid, and closed-minded.

I hope our magazine will be able to continue spreading the word that science is unprejudiced and open-ended, cautiously supporting findings once there is sufficiently strong evidence that they are dependable, until further research either finds proof to the contrary or improves on the earlier findings.

Adriaan J.W. Mak
London, Ontario
Canada

For the reasons cited by Kendrick Frazier, I applaud the name change from CSICOP to CSI, the Committee for Skeptical Inquiry. As mentioned, the title is shorter, more "media-friendly," and sheds the potentially stigmatizing reference to the paranormal.

I was a bit disappointed, though, that the Executive Council did not also change the title of the SKEPTICAL INQUIRER. About fifteen years ago, I knew absolutely nothing about CSICOP and the SKEPTICAL INQUIRER. When I initially glanced at an advertisement for the magazine, my first association was with the *National Enquirer*. Is your magazine's title a play on the name, a parody of the *National Enquirer*? Maybe most people wouldn't have similar associations. Perhaps others with absolutely no knowledge of the SKEPTICAL INQUIRER would instantly surmise that this is a respected, scientifically oriented publication. Or maybe not. How important are first impressions? You don't have to be a psychologist or advertising professional to know the answer. Empirical investigation of first impressions to the SKEPTICAL INQUIRER title might prove enlightening.

How about also considering or evaluating initial impressions to the alternative titles: *Skeptical Inquiry* or *Skeptical Investigator*?

Andrew D. Reisner
Cambridge, Ohio

I would like to voice not so much my opposition to your organization's name change (it will grow on me) but rather a warning about the possible explosion of the roach population that could result from promoting the broader scope of CSI, i.e., influencing public policy, improving science education, unraveling the mysteries of how we think, etc. at the expense of the main focus of CSICOP, which any rational person will tell you is the scientific investigation of claims of the paranormal.

In his editorial, "It's CSI Now, Not CSICOP," Kendrick Frazier states that promoters of the paranormal still go unchallenged to a certain extent, leaving this reader with the impression that all that is left is to mop up the stragglers. As ever, the literary device "to a certain extent" faithfully serves authors by being ambiguous and dismissive. Let me quantify for you the "extent" to which I think promoters of the paranormal still go unchallenged. It is the extent to which this publication fails to challenge them. Who else is there? No one does it like you do. That *was* pretty much the case in the years before CSICOP and that will remain the case as the bulk of CSI's attention wanders off towards more "noble and worthwhile" concerns.

It is said, "When you turn on the kitchen light, the gathered cockroaches take flight." This metaphor applies nicely here with the promoters of the paranormal playing the part of the roaches and the SKEPTICAL INQUIRER as the kitchen light. With less page space given over to the investigation of the claims of the paranormal, the interval of darkness between the moments of light will lengthen, and in the gloom of the cold, hard kitchen floor, the population of the gathering cockroaches will grow.

Michael Hinckle
Oak Creek, Wisconsin

I applaud your new name and the reasoning behind it. (And, as a fan of the original *CSI* TV show, I agree the "coincidence" can't hurt.) I have long appreciated that your magazine explores a variety of subjects beyond just the paranormal. I enjoy your debunking of UFOs, Bigfoot, "recovered memories," and such.

John Clinger
Richmond, Virginia

As a subscriber to the SKEPTICAL INQUIRER since the early eighties, I read with interest the editorials regarding the name change to CSI and the expanded mandate for skeptical inquiry. As a person with a long interest in the scientific analysis of extraordinary claims, I would like to voice support for expanding the scope of the committee's inquiries beyond the field of the paranormal. As you noted in your editorial, CSICOP has never really been limited to only such a narrow range of interests, anyway.

In this regard, I would hope that one of the first issues that such an expansion would encompass would include the entire field of global climate change and the role of human influences on global warming. Notwithstanding the claims of a consensus, there appear to be a determined group of skeptics using scientific arguments that disagree with the current political and scientific statements attributed to the IPCC on the severity and extent of man's influence on the climate.

John W. Maxwell
maxwell.j.w@worldnet.att.net

See the article "Global Climate Change Triggered by Global Warming" in this issue. Author Stuart D. Jordan, among other things, briefly summarizes and examines arguments by the global warming skeptics.—EDITOR

Mass Hysteria

Robert Bartholomew and Benjamin Radford wrote a thoughtful article on mass hysteria in schools and its persistence ("Mass

Hysteria at Starpoint High," January/February 2007). Among their examples is one from Chechnya in 2005, during which schoolchildren believed they were being gassed by Russians. The public reaction to this supposed gassing is a demonstration of the political power that can be derived from such events.

In March 1983, several Palestinian high-school girls fainted in their classrooms, one following another. The fainting spells spread rapidly throughout the West Bank, until up to 1,000 girls were hospitalized. Doctors could find no medical reasons for their sudden illnesses (nor their quick recoveries). Word quickly went out, though, that the Israelis must be poisoning young girls to reduce the Arab population.

This "mass poisoning" became a modern blood libel exploited by the Palestinian leadership. International organizations and newspapers picked up the story, demanding international action against Israel. The United Nations Security Council condemned Israel for its perfidy.

It took a study by the Centers for Disease Control in Atlanta to finally label the West Bank "poisonings" a case of mass hysteria. Only *The New York Times* retracted its accusations against Israel; all other newspapers simply went silent on the story. The 1983 West Bank mass hysteria was a successful weapon in the propaganda war against Israel.

It is clear that mass hysteria can have enormous effects, so the more we understand this phenomenon and, as the authors emphasize, the more quickly we diagnose and honestly label it, the better for us all.

Mark A. Wilson
Lewis M. and Marian Senter Nixon Professor of the Natural Sciences
Department of Geology
The College of Wooster
Wooster, Ohio

For a report on the West Bank case, see James R. Stewart, "The West Bank Collective Hysteria Episode," SKEPTICAL INQUIRER, Winter 1991, republished in my anthology of SI articles, Encounters with the Paranormal: Science, Knowledge, and Belief*, Prometheus Books, 1998.—EDITOR*

Hysteria in schools is very widespread in Africa. In my ten years living there, especially in eastern and southern Africa, there was an article almost every week in a newspaper about having to close a school, usually a high school, for at least two days to "solve" a problem. Most of the time, these hysterical outbursts were in girls' schools. A few students would have an hysterical fit because of some fight or "ghost," and the class, then the whole school, would break down. Of course, these are either psychological (maybe due to stress) experiences or planned activities by the students to close the school to get a vacation. Some schools had to close for a long time to be expunged of the evil influence by a local shaman.

Richard Kimball
Franklin, North Carolina

Your article on mass hysteria prompts me to report an experience over a half a century ago when I was recruited for National Service in the British Army. I was standing in long lines awaiting vaccination against several diseases for service in Hong Kong. I had no fear of needles; indeed, I have none to this day. But perhaps twenty-five yards ahead, where the people in line approached the medics, I could see able-bodied recruits dropping out in large numbers. For a while, I observed the activity dispassionately, discussing it with others. Then, to my horror, I began to feel faint.

David Fishlock
Jordans, Bucks
England

"Mass Hysteria at Starpoint High" misses a crucial issue. The conclusion of mass hysteria, not an actual problem, at West Cedar Elementary School presupposes that we should have confidence in the analysis and conclusions of the experts from the Environmental Protection Agency even with the knowledge that their analysis of Ground Zero air quality after September 11, 2001, deliberately misled the public. My paranoia—the result of the current administration's interpretation of science—gives me little confidence when I am told that the EPA has come to the conclusion that all is well. Maybe the 41 percent of the parents wanting their children relocated makes sense when there is so little confidence in the motivation of a government agency.

Sanford M. Sorkin
Upper Montclair, New Jersey

Art of Persuasion

"The Art of Persuasion in Politics (and Science)" by Benjamin Wolozin (January/February 2007) suggests that a political debater should counter an opponent's views by manipulating the so-called cognitive framework. For example, a conservative might advocate tax cuts, but you can point out that he is favoring "deficit-raising tax cuts." Wolozin asks, "Who could possibly be in favor of those?" This point seems to invite quantitative treatment.

The federal deficit is a chimera that can be calculated according to taste by excluding or including selected items. The total IRS tax-collection dollars are not debatable. In billions, they amounted to 2.268 in 2005, 2.018 in 2004, and 1.486 in 1996, before the tax cut. Per-capita collections were 7,625; 6,848; and 5,589. Wolozin should have asked who could possibly be in favor of increasing tax collections by cutting tax rates.

Wolozin describes the national situation thus: "One of the greatest problems facing our society is that many of the cognitive frameworks provided by *many* conservatives and *some* liberals [emphasis added] run contrary to discoveries made through scientific investigation; cognitive frameworks that deny reality are a long-term threat for our society." Throughout the article, the reader is told that liberals are more enlightened than conservatives. Wolozin has a right to believe this, but to embody it in a method for political persuasion goes beyond condescension to partisan arrogance.

Kay Brower
Professor Emeritus of Chemistry
New Mexico Institute of Mining and Technology
Socorro, New Mexico

Benjamin Wolozin claims that liberals argue a contradictory platform because they are "against capital punishment but in favor of abortion." This statement is untrue. Liberals are neither for nor against abortion; rather, we favor choice and access. In fact, most of us would be happy to see the need for abortions disappear through improved access to safe, reliable, cheap birth control.

For us to be self-contradictory in the way Wolozin describes, we would have to argue against capital punishment and for pregnancy

termination across the board. I hope he will concede that that is hardly the case!

Bonnie Sloane
Los Angeles, California

Citing George Lakoff's 2004 book, *Don't Think of an Elephant,* Benjamin Wolozin writes, "Conservatives are generally pro-capital punishment but anti-abortion. How can they favor death on the one hand but oppose it on the other?"

It's a measure of how isolated liberals like Wolozin and Lakoff are from actual conservative thought that the obvious rejoinder never occurs to them. The pro-lifer replies, he will cheerfully approve the abortion of any fetus convicted of murder! (And, in fact, even the most radical pro-lifer allows for abortion to save the life of the mother.) Thus, there is no inconsistency for Lakoff's far-fetched "strong-father" theory of conservatism to explain.

Taras Wolansky
Kerhonkson, New Jersey

Gulf War Syndrome

Benjamin Radford's special report "New Report Casts Doubt on Gulf War Syndrome" (January/February 2007) does not meet the standards I expect from your magazine. Radford starts out by stating that the controversy over Gulf War Syndrome "highlights the difficulties of scientific and medical certainty," which is certainly true, but, immediately after those words, he states "as well as a common logical fallacy: *post hoc ergo propter hoc*." In short, Radford is not "skeptically inquiring," he has made up his mind. The article ends by stating "those truly suffering from the illness are not faking or imagining the symptoms; instead they are simply misattributing the cause." In my opinion, it is too soon to draw that conclusion. Absence of evidence is not evidence of absence, as you surely know. Sometimes the impossible becomes scientific fact when methods of measurement improve. In recent years, for example, the role of endocrine-disrupting chemicals found in extremely small concentrations was initially considered impossible, but gradually has become scientifically accepted.

There are two other indications that Radford has an ax to grind. To illustrate the truism that "links that may seem obvious are not always clear," he uses the example "many lifelong smokers never get lung cancer, while many nonsmokers do." Do you really want to be known as the magazine that is skeptical about the link between (most) lung cancer and smoking?

Similarly, "there's little doubt that many things cause concern and stress every day, ranging from traffic jams to infidelity to wartime combat." Do you really want combat veterans to think of your magazine as equating wartime combat to traffic jams?

Janet S. Arnold
Oakland, California

Benjamin Radford responds:

I appreciate Janet Arnold's comments, but I have no "ax to grind" in the matter; I simply reported what the recent National Academy of Sciences study (and all previous studies) found: there is no evidence for Gulf War Syndrome. Ironically, Arnold criticizes my skepticism of those who dismiss Gulf War Syndrome as simply a symptom of stress. It seems Arnold misunderstood my analogies; I did not equate wartime combat to traffic jams, nor am I skeptical about whether smoking causes lung cancer. The latter example was in fact used to show that even in cases with overwhelming evidence, causes and effects are not always clear.

World Trade Center Illness

I am deeply disappointed and disturbed that you would publish Michael Fumento's obvious propaganda piece ("World Trade Center Illness: Manufactured Mass Hysteria," January/February 2007). It is clear from the start that Fumento's real goal is not to examine WTC illness but to "prove" that environmental toxins never cause illness. ChronWatch, where the article originally appeared, is a Far Right site that routinely publishes material that dismisses evolution, global warming, and other scientific theories as liberal fantasies. A number of studies have shown that those in the area of the World Trade Center collapse suffer from breathing problems. By comparison, those claiming to suffer from Gulf War Syndrome report that they suffer from a whole list of complaints, most of which have not been verified, as noted by Benjamin Radford in the same issue. Just because some mass illnesses are caused by stress, as is apparently the case with Gulf War Syndrome, does not mean that they all are.

James Norton
Fresno, California

The article "World Trade Center Illness: Manufactured Mass Hysteria" is a simplistic, right-wing, hatchet job that should never have been published in a magazine that is supposed to be scientific and apolitical. I hope that others more knowledgeable in this area will give you a more credible critique than anything I can do, but for a good contrary report, I suggest starting with "Gullibility Begins at Home," which is available at www.fair.org/index.php?page=3020.

I note that the author is "a senior fellow at the Hudson Institute," a notoriously pro-Bush administration think tank, and "the author of . . . *The Myth of Heterosexual AIDS*." What more needs to be said?

John S. Derr
Tijeras, New Mexico

I was very disappointed to read "World Trade Center Illness: Manufactured Mass Hysteria" as a Special Report in SI. What were the editors thinking when they allowed this bombastic piece of pseudoscientific writing to be published in SI? Michael Fumento has no clue as to the substantial body of medical literature linking the inhalation of particles with subsequent respiratory disease. The Mount Sinai Pulmonary Division is one of several groups studying the respiratory effects of the WTC collapse. Similar observational studies have been done on the Mount St. Helen eruption, hotel fires, forest fires, and industrial accidents. Extensive work has been done in study of the WTC collapse including chemical and physical analysis of the dust and its effects on animals and on human cell cultures. The Mount Sinai group and others have followed pulmonary functions and symptoms in over 12,000 members of the New York Fire Department work force. The advantage in studying members of the NYFD is that virtually all had spirometry testing prior to September 11, 2001. About 85 percent of the FDNY workers agreed to complete questionnaires and have follow-up testing. Over 90,000 spirometry tests were done to collect the 30,000 values used to report the recent results on the NYFD.

The results will provide information on the time course of any lung injury and of any repair. The work being done will provide more insight into the types of building materials and conditions that pose the greatest threat to workers and provide insight into providing appropriate protective equipment for them. This type of research will help us predict and prevent lung injuries.

Michael Fumento doesn't get it. His unfounded references to psychogenic illness are offensive and unfounded as an explanation for these published results.

Edward Schuman, MD
Meadowbrook, Pennsylvania

Volkay's Spoof

Who is this upstart who challenges the divine right of us humans? Who is this Chris Volkay who dares disturb the universe? I refer to the January/February 2007 column titled, "Bigfoot, Pluto, and ?"

I say ignite the torches and sharpen the pitchforks at both ends. Imagine challenging our Manifest Destiny. Doesn't Volkay know we have been created in the image of the "Great One"? We are God's vicars and heirs to heaven. When we fly a plane into a building, blow up a pizza parlor, or drop an atomic bomb on 100,000 civilians, we are doing God's work.

However, when it all comes down to the bottom line, it's about greed and money inspired by countless divinities. It's only business. Our myths are inextricably tied into the economic process. How could we justify such activities without our myths? We are a warrior species, genetically programmed to conquer and destroy. Our myths provide a matrix for our behavior, and along comes this heretic trying to take away our cloak of justification. They comfort us. Why, with a good myth, we can actually get some sleep.

To the pillory with Chris Volkay. This dissenter of mythologies and dogma, which have taken us thousands of years to refine to the point of a large radioactive mushroom cloud.

Today, it's Bigfoot, our afterlife and its rewards, reincarnation, karma, etc., etc. What will this heathen think of next? We, God's heirs, are not safe with the likes of Chris Volkay.

Nicholas Cariglia
elpuffino@yahoo.com

There have been many occasions on which SI can point with pride to articles it has published. The premier example is the column by Chris Volkay, "Bigfoot, Pluto, and ?" In an article of remarkable brevity, scarcely longer than a letter to the editor, Volkay combines crystal-clear logic and incisive wit to produce what may well be the best article I have ever read. Mr. Volkay cuts to the core (perhaps to the quick, for some people) of the major problem confronting the world and the ancillary problems associated with mindless dedication to belief in the afterlife. It is by any standard a most remarkable piece of writing, and I salute Volkay for it. I would hope that the entire skeptical community would join me in doing so.

Jerry F. O'Donnell
Artesia, New Mexico

"Bigfoot, Pluto and ?" (January/February 2007) by Chris Volkay, was a wonderful spoof of those who believe in an afterlife. Of all the frauds ever perpetrated and perpetuated by the human race, it is the egregious concept of a life after death that has caused more suffering, sorrow, and sadness than any other form of deceit. It is promoted primarily for the benefit of those who have gained power for their personal benefit, while the masses are trapped in a web of fear controlled by religion and duty to one's beliefs.

Clint Jones
Squim, Washington

In calling for the elimination of "gods," Chris Volkay goes from tongue-in-cheek to foot-in-mouth.

First, he says, "Think of the incalculable lives we would save. . . . We could eliminate so much hatred. . . . Instead of turning people into soldiers, we could make them into citizens, human beings." Volkay is clearly not conversant with history. The most *liberal* estimate of those killed in all the religious wars, witch burnings, pogroms, etc. *in all of history* is 25 to 50 million. Yet between them, Stalin, Mao, Hitler, and Pol Pot—committed atheists all (Hitler was not a Christian; he simply "used" Christianity to further his agenda)—murdered over 100 million people, and did it in less than sixty years.

He then says, ". . . think of the benefits. People actually living here and now, in this life. . . . Instead of simply existing until death . . . they would be forced to actually seize the reins of their lives and make the best they could of them right here and now."

I cannot speak for other faiths, but Volkay is apparently not conversant with the New Testament. Although Jesus certainly spoke of salvation and eternal life, His ministry—love, peace, forgiveness, compassion, humility, patience, tolerance, charity, selflessness, service, justice—*was* about how to live in the "here and now." "Love your enemies," "Judge not lest ye be judged in equal measure," and his continual admonitions to (among other things) help the poor and less fortunate among us were meant as guidelines for sharing this planet with all people during our lives *here*.

The canard that the elimination of religion, and religious people, would somehow make the world better—supported by high-profile atheists such as Sam Harris, Richard Dawkins, Daniel Dennett, and Bill Maher—is simply not supported by history or the facts. So much for the logic and reason of the scientific community.

Rev. Ian Alterman
New York City, New York

'Dr.' Bearden's Antigravity

In his article in the January/February 2007 issue, Martin Gardner writes that Thomas Bearden is interested in antigravity machines. In connection to this, I would like to mention that the Institut für Gravitationsforschung, based in Waldaschaff (a village near Frankfurt in Germany) offers an award of 1 million euros (the "Göde prize") to an applicant who can influence gravity with presently unknown methods. A twenty-gram device is required to float freely at least one minute at a minimum distance of ten centimeters from any surface (source: www.gravitation.org).

I asked the opinion of a well-known German astronomer, who replied that, at the observatory where he works, nobody knows of that "institute" interested in levitation.

Jean Meeus
Kortenberg, Belgium

I read with interest Martin Gardner's "Dr. Bearden's Vacuum Energy" article, and I have read the "Zero-Point Energy and Harold Putoff" in the same vein. I would like to refer to another similar project in France which, I believe, deserves similar critique. The project is "The Vallée Synergetic Generator," and you can see it on the Internet at http://jlnlabs.imars.com/vsg/index.htm. You can find a lot more about the promoter of that project by searching on the Internet on "René-Louis Vallée."

Luis F. Helbling
luis.helbling@cyberus.ca

Not in the Numb3rs

[Numb3rs star] David Krumholtz, quoted in the January/February 2007 issue, needs to modify his dream of meeting someone in thirty or forty years who says, "I won the Nobel Prize because I watched you in Numb3rs." Unfortunately, there is no Nobel Prize in Mathematics. My wish for Krumholtz is that one of his current viewers will someday be a recipient of the Fields Medal, the most prestigious award given in mathematics.

Herb Silverman
Distinguished Professor of Mathematics
College of Charleston
Charleston, South Carolina

Intelligent Thought

Having reviewed *Intelligent Thought: Science versus the Intelligent Design Movement* for *Free Inquiry*, I found myself in general agreement with Matt Young's insightful review in the January/February 2007 issue of the SKEPTICAL INQUIRER, in particular his point that (contrary to the suggestion of the book's subtitle) the authors fail to provide a comprehensive scientific critique of intelligent-design creationism. Young modestly neglected to mention that such a critique is provided in the pages of *Why Intelligent Design Fails* (Rutgers University Press, 2004), of which he and Taner Edis are the editors, and which I enthusiastically recommend to anyone interested in the scientific failings of the latest incarnation of creationism.

Glenn Branch
Deputy Director
National Center for Science Education
Oakland, California

The letters column is a forum for views on matters raised in previous issues. **Letters should be no more than 225 words.** Due to the volume of letters not all can be published. Address letters to Letters to the Editor, SKEPTICAL INQUIRER. Send by e-mail text (not as an attachment) to letters@csicop.org (include your name and address). Or mail to 944 Deer Drive NE, Albuquerque, NM 87122, or fax to 505-828-2080.

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ARGENTINA. Alejandro J. Borgo. Revista *Pensar*. E-mail: info@pensar.org; Enrique Márquez, e-mail: skeptic@ciudad.com.ar; Juan de Gennaro, e-mail: argentinaskeptics@gmail.com.

BELGIUM. Comité Belge Pour L'Investigation Scientifique des Phénomènes Réputés Pananormaux Comité Para, Belgium. J. Dommanget, President of the Committee. E-mail: omer.nys@oma.be. Observatoire Royal Belgique 3, ave. Circulaire B-1180, Brussels, Belgium. www.comitepara.be. **Studiekring voor Kritische Evaluatie van Pseudowetenschap en Paranormale beweringen** (SKEPP) Belgium. Prof. Dr. W. Betz. Tel.: 32-2-477-43-11; e-mail: skepp@skepp.be Laarbeeklaan. 103 B-1090 Brussels, Belgium. www.skepp.be.

BRAZIL. Opçao Racional, Brazil. Luis Fernando Gutman. Tel.: 55-21-25392442 x4401; e-mail: opcaoracional@hotmail.com. Rua Professor Álvaro Rodrigues 255 apt 401 Botafogo. CEP: 22280-040, Rio de Janeiro, Brazil. www.opcaoracional.com.br.

BULGARIA. Bulgarian Skeptics, Bulgaria. Dr. Vladimir Daskalov. E-mail: egoshev@einet.bg. Krakra 22 BG-1504 Sofia, Bulgaria.

CANADA. British Columbia Skeptics, BC and Alberta. Lee Moller. Tel. 604-929-6299; e-mail:leemoller@shaw.ca. www.bcskeptics.info. 1188 Beaufort Road, N. Vancouver, BC V7G 1R7 Canada. **Ontario Skeptics**, Ontario, Canada. Eric McMillan, Chair. Tel.: 416-425-2451; e-mail: eric@we-compute.com. P.O. Box 554 Station "P" Toronto, ON M5S 2T1 Canada. www.astro.yorku.ca/~mmdr/oskeptics.html. **Toronto Skeptical Inquirers** (TSI) Toronto. Henry Gordon, President. Tel.: 905-771-1615; e-mail: henry_gordon@hotmail.com. 343 Clark Ave., W., Suite 1009, Thornhill, ON L4J 7K5 Canada. **Ottawa Skeptics**, Ottawa, Ontario. Greg Singer. E-mail: skeptic@ottawa.com. PO Box 1237, Station B, Ottawa, Ontario K1P 5R3 Canada.www.admissions.carleton.ca/~addalby/cats/skeptic.html. **Sceptiques du Quebec**, Quebec. Alan Bonnier. Tel.: 514-990-8099. C.P. 202, Succ. Beaubien Montreal, Quebec H2G 3C9 Canada. www.sceptiques.qc.ca. **Skeptics Quinte**, Bill Broderick. 2262 Shannon Rd. R.R. 1, Shannonville, ON K0K 3A0; e-mail: broderic@kos.net.

CHINA. China Association for Science and Technology, China. Shen Zhenyu Research Center, P.O. Box 8113, Beijing China. **Hong Kong Skeptics**, Hong Kong. Kevin Ward, P.O. Box 1010, Shatin Central Post Office, Shatin NT China.

COSTA RICA. Iniciativa para la Promoción del Pensamiento Crítico (IPPEC) San Jose. Adolfo Solano; e-mail: didiersolano@hotmail.com. Postal address: Adolfo Solano (IPPEC-CR), A.P. 478-7050, Cartago, Costa Rica.

CZECH REPUBLIC. Sisyfos-Czech Skeptics Club. Czech Republic. Ms. Ing. Olga Kracikova, Secretary. Tel.: 420-2-24826691; e-mail: olgakracikova@email.cz. Hastalska 27 Praha 1 110 00 Czech Republic. www.fi.muni.cz/sisyfos/ (in Czech).

DENMARK. Skeptica: Association of Independent Danish Skeptics, Denmark. Willy Wegner. Tel.: 45-75-64-84-02; e-mail: skeptica@skeptica.dk. Vibevej 7 A DK 8700 Horsens, Denmark. www.skeptica.dk.

ECUADOR. Prociencia, Gabriel Trueba, Quito, Ecuador. Tel.: 2-894-320; e-mail: gabriel@mail.usfg.edu.ec.

ESTONIA Horisont. Indrek Rohtmets. EE 0102 Tallinn, Narva mnt. 5.

FINLAND. SKEPSIS, Finland. Jukka Hakkinen. PO Box 483, Helsinki 00101 Finland.

FRANCE. AFIS, AFIS (Association Française pour l'Information Scientifique) France. Jean Bricmont, President. 14 rue de l'Ecole Polytechnique F-75005 Paris, France. **Le Cercle Zététique**, France. Paul-Eric Blanrue. 12 rue; David Deitz. F-57000 Metz, France. **Laboratoire de Zététique** (laboratory). Professeur Henri Broch. Tel.: 33-0492076312; e-mail:broch@unice.fr. Université de Nice-Sophia Antipolis Faculté des Sciences F-06108 Nice Cedex 2 France. www.unice.fr/zetetique/.

GERMANY. Gesellschaft zur wissenschaftlichen Unterrsuchung von Parawissenschaften (GWUP) Germany. Amardeo Sarma, Chairman. Tel.: 49-6154-695023. E-mail: info@gwup.org. Arheilger Weg 11 D-64380 Rossdorf, Germany. www.gwup.org. **European Council of Skeptical Organizations** (ECSO) Europe. Dr. Martin Mahner. Tel.: 49-6154-695023; e-mail: info@ecso.org. Arheilger Weg 11 64380 Rossdorf, Germany. www.ecso.org/.

HUNGARY. Tényeket Tisztelk Társasága TTT Hungary. Prof. Gyula Bencze. Tel.: 36-1-392-2728; e-mail: gbencze@rmki.kfki.hu. *c/o Természet Világa*, PO Box 246 H-1444 Budapest 8 Hungary.

INDIA. Atheist Centre, Dr. Vijayam, Executive Director. Benz Circle, Vijayawada 520 010, Andhra Pradesh, India. Tel.: 91 866 472330; Fax: 91 866 473433. E-mail: atheist@vsnl.com. **Maharashtra Andhashraddha Nirmoolan Samiti** (MANS) states of Maharashtra & Goa. Dr. Narendra Dabholkar, Executive President. Tel.: 91-2162-32333; e-mail: ndabholkar@hotmail.com. 155, Sadashiv Peth Satara 415001 India. www.antisuperstition.com. **Indian Rationalist Association**, India. Sanal Edamaruku. E-mail: edamaruku@vsnl.com or IRA@rationalist international.net. 779, Pocket 5, Mayur Vihar 1, New Delhi 110 091 India. Dravidar Kazhagam, southern India. K. Veeramani, Secretary General. Tel.: 9144-5386555; e-mail: periyar@vsnl.com. Periyar Thidal, 50, E.F.K. Sampath Road Vepery, Chennai Tamil Nadu 600 007 India. www.Periyar.org. **Indian CSICOP**, India, B. Premanand, Convenor. Tel.: 091-0422-872423; e-mail: dayamini@md4.vsnl.net.in. 11/7 Chettipalayam Road Podanur Tamilnadu 641 023 India.

ITALY. Comitato Italiano per il Controllo delle Affermazioni sul Paranormale (CICAP) Italy. Massimo Polidoro, Executive Director. Tel.: 39-049-686870; e-mail: polidoro@cicap.org. P.O. Box 1117 35100 Padova, Italy. www.cicap.org.

IRELAND. The Irish Skeptics Society c/o Paul O'Donoghue, 11 Woodleigh Elm, Highfield Rd., Rathgar, Dublin 6. Ireland; www.irishskeptics.net E-mail:contact@irishskeptics.net.

JAPAN. Japan Anti-Pseudoscience Activities Network (JAPAN) Japan. Ryutarou Minakami, chairperson. c/o Rakkousha, Inc., Tsuruoka Bld. 2F, 2-19-6, Kamezawa, Sumida-ki,Tokyo. skeptic@e-mail.ne.jp. **Japan Skeptics**, Japan. Dr. Jun Jugaku. E-mail: jugakujn@cc.nao.ac.jp. Japan Skeptics, Business Center for Academic Societies, Japan 5-16-9 Honkomagome, Bunkyo-ku Tokyo 113-8622 Japan.

KAZAKHSTAN. Kazakhstan Commission for the Investigation of the Anomalous Phenomena (KCIAP) Kazakhstan. Dr. Sergey Efimov, Scientific Secretary. Astrophysical Institute, Kamenskoye Plato, Alma-Ata, 050020, Kazakhstan. E-mail: efim@aphi.kz.

KOREA. Korea PseudoScience Awareness (KOPSA) Korea. Dr. Gun-Il Kang, Director. Tel.: 82-2-393-2734; e-mail: KOPSA@chollian.net. 187-11 Bukahyun-dong, Sudaemun-ku, Seoul 120-190 Korea www.kopsa.or.kr.

MALTA. Society for Investigating the Credibility of Extraordinary Claims (SICEC) Malta. Vanni Pule, Chairman. Tel.: 356-381994; e-mail: pulevan@vol.net.mt. Address: c/o 67, Trig il-Pruna, Attard, BZN04, Malta.

MEXICO. Mexican Association for Skeptical Research (SOMIE) Mexico. Mario Mendez-Acosta, Apartado Postal 19-546 D.F. 03900 Mexico.

NETHERLANDS. Stichting Skepsis, Netherlands. Jan Willem Nienhuys, Secretary. e-mail: jnienhuy@win.tue.nl. Dommelseweg 1A, 5581 VA Waalre, Netherlands.

NEW ZEALAND. New Zealand Skeptics, New Zealand, Vicki Hyde, Chair. Tel.: 64-3-384-5136; e-mail: Vicki@spis.co.nz. PO Box 29-492, Christchurch, New Zealand. www.skeptics.org.nz.

NIGERIA. Nigerian Skeptics Society, Nigeria. Leo Igwe, Convenor. E-mail: dpc@skannet.com.ng. PO Box 25269, Mapo Ibadan Oyo State, Nigeria.

NORWAY. SKEPSIS. Norway St. Olavsgt. 27 N-0166 Oslo, Norway.

PERU. Comite de Investigaciones de lo Paranormal lo Seudocientifico y lo Irracional CIPSI-PERU, Lima, Peru. Manuel Abraham Paz-y-Mino. Tel.: +51-1-99215741; e-mail: cipsiperu@yahoo.com. El Corregidor 318 Rímac, Lima 25 Peru. www.geocities.com/cipsiperu.

POLAND. Polish Skeptics, Adam Pietrasiewicz. E-mail: redaktor@iname.com. www.biuletynsceptyczny.z.pl.

PORTUGAL. Associaçao Cépticos de Portugal (CEPO) Portugal. Ludwig Krippahl. E-mail: cepo@interacesso.pt. Apartado 334 2676-901 Odivelas, Portugal. http://cepo.interacesso.pt.

RUSSIA. Dr. Valerii A. Kuvakin. Tel.: 95-718-2178; e-mail: V.KUVAKIN@MTU-NET.RU. Vorob'evy Gory, Moscow State University, Phil. Dept. Moscow 119899 Russia. http://log.philos.msu.ru/rhs/index/htm.

SINGAPORE. Singapore Skeptics. Contact: Ronald Ng. E-mail: ronaldng@iname.com.www.skeptic.iwarp.com.

SLOVAK REPUBLIC (SACT). Slovak Republic. Igor Kapisinsky Pavla Horova, 10 Bratislava 841 07 Slovak Republic.

SOUTH AFRICA. Marian Laserson. P.O. Box 46212, Orange Grove 2119 South Africa. **SOCRATES. South Africa. Cape Skeptics**, Cape Town. Dr. Leon Retief. Tel.: 27-21-9131434. E-mail: leonr@iafrica.com. 5N Agapanthus Avenue, Welgedacht Bellville 7530 South Africa.

SPAIN. Círculo Escéptico. Fernando L. Frías, chairman. Apartado de Correos 3078, 48080 Bilbao, Spain. E-mail: informacion@circuloesceptico.org. Web site: www.circuloesceptico.org. **ARP-Sociedad para el Avance del Pensamiento Crítico** ARP-SAPC Spain. Félix Ares de Blas. Tel.: 34-933-010220; E-mail: arp@arp-sapc.org. Apartado de Correos, 310 E-08860 Castelldefels, Spain. www.arp-sapc.org.

SRI LANKA. Sri Lanka Rationalist Assoc. Contact: Dushyantha Samaiasinghe, Promethean Home, 192/D Dawatagahawatta Rd., Kesbewa, Piliyandala, Sri Lanka.

SWEDEN. Swedish Skeptics, Sweden. Jesper Jerkert, chairperson. Vetenskap och Folkbildning c/o Sigbladh Administration Box 10022 S-181 10 Lidingö Sweden. E-mail: info@vof.se; Web site: www.vof.se/.

TAIWAN. Taiwan Skeptics, Taiwan. Michael Turton, Director. AFL Dept., Chaoyang University. 168 G-IFeng E. Rd., Wufeng, Taichung 413.

UNITED KINGDOM. *The Skeptic* Magazine, United Kingdom. Mike Hutchinson. E-mail: subs@skeptic.org.uk. P.O. Box 475 Manchester M60 2TH United Kingdom.

VENEZUELA. Asociación Racional Escéptica de Venezuela (AREV), Sami Rozenbaum, president. Address: Rozenbaum, Apdo. 50314, Caracas 1050-A, Venezuela. Web site: www.geocities.com/escepticos venezuela. E-mail: escepticos@cantv.net.

United States

ALABAMA. Alabama Skeptics, Alabama. Emory Kimbrough. Tel.: 205-759-2624. 3550 Watermelon Road, Apt. 28A, Northport, AL 35476 US.

ARIZONA. Tucson Skeptics Inc. Tucson, AZ. James McGaha. E-mail: JMCGAHA@PimaCC.Pima.EDU. 5100 N. Sabino Foothills Dr., Tucson, AZ 85715 US. **Phoenix Skeptics**, Phoenix, AZ. Michael Stackpole, P.O. Box 60333, Phoenix, AZ 85082 US.

CALIFORNIA. Sacramento Organization for Rational Thinking (SORT) Sacramento, CA. Ray Spangen-burg, co-founder. Tel.: 916-978-0321; e-mail: kitray@quiknet.com. PO Box 2215, Carmichael, CA 95609-2215 US. www.quiknet.com/~kitray/index1.html. **Bay Area Skeptics** (BAS) San Francisco—Bay Area. Tully McCarroll, Chair. Tel.: 415 927-1548; e-mail: tullyann@pacbell.net. PO Box 2443 Castro Valley, CA 94546-0443 US. www.BASkeptics.org. **Independent Investigations Group (IIG),** Center for Inquiry–*West*, 4773 Hollywood Blvd, Los Angeles, CA 90027 Tel.; 323-666-9797 ext. 159; Web site:www.iigwest.com. **Sacramento Skeptics Society**, Sacramento. Terry Sandbek, President. 4300 Auburn Blvd. Suite 206, Sacramento CA 95841. Tel.: 916 489-1774. E-mail: terry@sandbek.com. **San Diego Association for Rational Inquiry** (SDARI) President: Richard Urich. Tel.: 858-292-5635. Program general information 619-421-5844. Web site:www.sdari.org. Snail mail address: PO Box 623, La Jolla, CA 92038-0623.

COLORADO. Rocky Mountain Skeptics (RMS; aka Colorado Skeptics) Béla Scheiber, President. Tel.: 303-444-7537; e-mail: rms@peakpeak.com. PO Box 4482, Boulder, CO 80306 US. Web site: http://bcn.boulder.co.us/community/rms.

CONNECTICUT. New England Skeptical Society (NESS) New England. Steven Novella M.D., President. Tel.: 203-281-6277; e-mail: board@theness.com. 64 Cobblestone Dr., Hamden, CT 06518 US. www.theness.com.

D.C./MARYLAND. National Capital Area Skeptics NCAS, Maryland, D.C., Virginia. D.W. "Chip" Denman. Tel.: 301-587-3827. e-mail: ncas@ncas.org. PO Box 8428, Silver Spring, MD 20907-8428 US. http://www.ncas.org.

FLORIDA. Tampa Bay Skeptics (TBS) Tampa Bay, Florida. Gary Posner, Executive Director. Tel.: 813-849-7571; e-mail: tbs@cfiflorida.org; 5201 W. Kennedy Blvd., Suite 124, Tampa, FL 33609 US. www.tampabayskeptics.org. **The James Randi Educational Foundation.** James Randi, Director. Tel: (954)467-1112; e-mail jref@randi.org. 201 S.E. 12th St. (E. Davie Blvd.), Fort Lauderdale, FL 33316-1815. Web site: www.randi.org.

GEORGIA. Georgia Skeptics (GS) Georgia. Rebecca Long, President. Tel.: 770-493-6857; e-mail: arlong@hcrc.org. 2277 Winding Woods Dr., Tucker, GA 30084 US.

IOWA. Central Iowa Skeptics (CIS) Central Iowa, Rob Beeston. Tel.: 515-285-0622; e-mail: ciskeptics@hotmail.com. 5602 SW 2nd St. Des Moines, IA 50315 US. www.skepticweb.com.

ILLINOIS. Rational Examination Association of Lincoln Land (REALL) Illinois. Bob Ladendorf, Chairman. Tel.: 217-546-3475; e-mail: chairman@reall.org. PO Box 20302, Springfield, IL 62708 US. www.reall.org.

KENTUCKY. Kentucky Assn. of Science Educators and Skeptics (KASES) Kentucky. 880 Albany Road, Lexington, KY 40502. Contact Fred Bach at e-mail: fredwbach@yahoo.com; Web site www.kases.org; or (859) 276-3343.

LOUISIANA. Baton Rouge Proponents of Rational Inquiry and Scientific Methods (BR-PRISM) Louisiana. Marge Schroth. Tel.: 225-766-4747. 425 Carriage Way, Baton Rouge, LA 70808 US.

MICHIGAN. Great Lakes Skeptics (GLS) SE Michigan. Lorna J. Simmons, Contact person. Tel.: 734-525-5731; e-mail: Skeptic31@aol.com. 31710 Cowan Road, Apt. 103, Westland, MI 48185-2366 US. **Tri-Cities Skeptics**, Michigan. Gary Barker. Tel.: 517-799-4502; e-mail: barkerg@svol.org. 3596 Butternut St., Saginaw, MI 48604 US.

MINNESOTA. St. Kloud Extraordinary Claim Psychic Teaching Investigating Community (SKEPTIC) St. Cloud, Minnesota. Jerry Mertens. Tel.: 320-255-2138; e-mail: gmertens@stcloudstate.edu. Jerry Mertens, Psychology Department, 720 4th Ave. S, St. Cloud State University, St. Cloud, MN 56301 US.

MISSOURI. Kansas City Committee for Skeptical Inquiry, Missouri. Verle Muhrer, United Labor Bldg., 6301 Rockhill Road, Suite 412 Kansas City, MO 64131 US.

NEVADA. Skeptics of Las Vegas, (SOLV) PO Box 531323, Henderson, NV 89053-1323. E-mail: rbanderson @skepticslv.org. Web site: www.skepticslv.org./.

NEW MEXICO. New Mexicans for Science and Reason (NMSR) New Mexico. David E. Thomas, President. Tel.: 505-869-9250; e-mail: nmsrdave@swcp.com. PO Box 1017, Peralta, NM 87042 US. www.nmsr.org.

NEW YORK. New York Area Skeptics (NYASk) metropolitan NY area. Jeff Corey, President. 18 Woodland Street, Huntington, NY 11743, Tel: (631) 427-7262 e-mail: jcorey@liu.edu, Web site: www.nyask.com. **Inquiring Skeptics of Upper New York** (ISUNY) Upper New York. Michael Sofka, 8 Providence St., Albany, NY 12203 US. **Central New York Skeptics** (CNY Skeptics) Syracuse. Lisa Goodlin, President. Tel: (315) 446-3068; e-mail: info@cnyskeptics.org, Web site: cnyskeptics.org 201 Milnor Ave., Syracuse, NY 13224 US.

NORTH CAROLINA. Carolina Skeptics North Carolina. Eric Carlson, President. Tel.: 336-758-4994; e-mail: ecarlson@wfu.edu. Physics Department, Wake Forest University, Winston-Salem, NC 27109 US. www.carolinaskeptics.org.

OHIO. Central Ohioans for Rational Inquiry (CORI) Central Ohio. Charlie Hazlett, President. Tel.: 614-878-2742; e-mail: charlie@hazlett.net. PO Box 282069, Columbus OH 43228 US. **South Shore Skeptics** (SSS) Cleveland and counties. Jim Kutz. Tel.: 440 942-5543; e-mail: jimkutz@earthlink.net. PO Box 5083, Cleveland, OH 44101 US. www.southshoreskeptics.org/. **Association for Rational Thought** (ART) Cincinnati. Roy Auerbach, president. Tel: 513-731-2774, e-mail: raa@cinci.rr.com. PO Box 12896, Cincinnati, OH 45212 US. www.cincinnatiskeptics.org.

OREGON. Oregonians for Rationality (O4R) Oregon. Jeanine DeNoma, president. Tel.: (541) 745-5026; e-mail: wilkinsa@peak.org; 39105 Military Rd., Monmouth, OR 97361 US. Web site: www.o4r.com.

PENNSYLVANIA. Paranormal Investigating Committee of Pittsburgh (PICP) Pittsburgh PA. Richard Busch, Chairman. Tel.: 412-366-1000; e-mail: mindful@telerama.com. 8209 Thompson Run Rd., Pittsburgh, PA 15237 US. **Philadelphia Association for Critical Thinking** (PhACT), much of Pennsylvania. Eric Krieg, President. Tel.: 215-885-2089; e-mail: eric@phact.org. By mail C/O Ray Haupt 639 W. Ellet St., Philadelphia PA 19119.

TENNESSEE. Rationalists of East Tennessee, East Tennessee. Carl Ledenbecker. Tel.: 865-982-8687; e-mail: Aletall@aol.com. 2123 Stonybrook Rd., Louisville, TN 37777 US.

TEXAS. North Texas Skeptics NTS Dallas/Ft Worth area, John Blanton, Secretary. Tel.: 972-306-3187; e-mail: skeptic@ntskeptics.org. PO Box 111794, Carrollton, TX 75011-1794 US. www.ntskeptics.org.

VIRGINIA. Science & Reason, Hampton Rds., Virginia. Lawrence Weinstein, Old Dominion Univ.-Physics Dept., Norfolk, VA 23529 US.

WASHINGTON. Society for Sensible Explanations, Western Washington. Tad Cook, Secretary. E-mail: K7RA@arrl.net. PO Box 45792, Seattle, WA 98145-0792 US. http://seattleskeptics.org.

PUERTO RICO. Sociedad De Escépticos de Puerto Rico, Luis R. Ramos, President. 2505 Parque Terra Linda, Trujillo Alto, Puerto Rico 00976. Tel: 787-396-2395; e-mail: Lramos@escepticospr.com; Web site www.escepticor.com.

The organizations listed above have aims similar to those of CSI but are independent and autonomous. Representatives of these organizations cannot speak on behalf of CSI. Please send updates to Barry Karr, P.O. Box 703 Amherst NY 14226-0703.

SCIENTIFIC AND TECHNICAL CONSULTANTS

Gary Bauslaugh, editor, *Humanist Perspectives*, Victoria, B.C., Canada
Richard E. Berendzen, astronomer, Washington, D.C.
Martin Bridgstock, Senior Lecturer, School of Science, Griffith University, Brisbane, Australia
Richard Busch, magician/mentalist, Pittsburgh, Penn.
Shawn Carlson, Society for Amateur Scientists, East Greenwich, RI
Roger B. Culver, professor of astronomy, Colorado State Univ.
Felix Ares de Blas, professor of computer science, University of Basque, San Sebastian, Spain
Michael R. Dennett, writer, investigator, Federal Way, Washington
Sid Deutsch, consultant, Sarasota, Fla.
J. Dommanget, astronomer, Royale Observatory, Brussels, Belgium
Nahum J. Duker, assistant professor of pathology, Temple University
Barbara Eisenstadt, psychologist, educator, clinician, East Greenbush, N.Y.
William Evans, professor of communication, Center for Creative Media
Bryan Farha, professor of behavioral studies in education, Oklahoma City Univ.
John F. Fischer, forensic analyst, Orlando, Fla.
Eileen Gambrill, professor of social welfare, University of California at Berkeley
Luis Alfonso Gámez, science journalist, Bilbao, Spain
Sylvio Garattini, director, Mario Negri Pharmacology Institute, Milan, Italy
Laurie Godfrey, anthropologist, University of Massachusetts
Gerald Goldin, mathematician, Rutgers University, New Jersey
Donald Goldsmith, astronomer; president, Interstellar Media
Alan Hale, astronomer, Southwest Institute for Space Research, Alamogordo, New Mexico
Clyde F. Herreid, professor of biology, SUNY, Buffalo
Terence M. Hines, professor of psychology, Pace University, Pleasantville, N.Y.
Michael Hutchinson, author; SKEPTICAL INQUIRER representative, Europe
Philip A. Ianna, assoc. professor of astronomy, Univ. of Virginia
William Jarvis, professor of health promotion and public health, Loma Linda University, School of Public Health
I. W. Kelly, professor of psychology, University of Saskatchewan
Richard H. Lange, M.D., Mohawk Valley Physician Health Plan, Schenectady, N.Y.
Gerald A. Larue, professor of biblical history and archaeology, University of So. California
William M. London, California State University, Los Angeles
Rebecca Long, nuclear engineer, president of Georgia Council Against Health Fraud, Atlanta, Ga.
Thomas R. McDonough, lecturer in engineering, Caltech, and SETI Coordinator of the Planetary Society
James E. McGaha, Major, USAF; pilot
Joel A. Moskowitz, director of medical psychiatry, Calabasas Mental Health Services, Los Angeles
Jan Willem Nienhuys, mathematician, Univ. of Eindhoven, the Netherlands
John W. Patterson, professor of materials science and engineering, Iowa State University
Massimo Pigliucci, professor in Ecology & Evolution at SUNY-Stony Brook, NY
James R. Pomerantz, professor of psychology, Rice University
Gary P. Posner, M.D., Tampa, Fla.
Daisie Radner, professor of philosophy, SUNY, Buffalo
Robert H. Romer, professor of physics, Amherst College
Karl Sabbagh, journalist, Richmond, Surrey, England
Robert J. Samp, assistant professor of education and medicine, University of Wisconsin-Madison
Steven D. Schafersman, asst. professor of geology, Miami Univ., Ohio
Chris Scott, statistician, London, England
Stuart D. Scott, Jr., associate professor of anthropology, SUNY, Buffalo
Erwin M. Segal, professor of psychology, SUNY, Buffalo
Carla Selby, anthropologist/archaeologist
Steven N. Shore, professor and chair, Dept. of Physics and Astronomy, Indiana Univ. South Bend
Waclaw Szybalski, professor, McArdle Laboratory, University of Wisconsin-Madison
Sarah G. Thomason, professor of linguistics, University of Pittsburgh
Tim Trachet, journalist and science writer, honorary chairman of SKEPP, Belgium
David Willey, physics instructor, University of Pittsburgh
*Member, CSICOP Executive Council

CENTERS FOR INQUIRY

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TRANSNATIONAL
P.O. Box 703, Amherst, NY 14226
Tel.: (716) 636-1425

WASHINGTON, D.C.
621 Pennsylvania Ave. SE, Washington, D.C. 20003, Tel.: (202) 546-2331

WEST
4773 Hollywood Blvd., Los Angeles, CA 90027 Tel.: (323) 666-9797

METRO NEW YORK
One Rockefeller Plaza, #2700, New York, NY 10020
Tel.: (212) 265-2877

POLAND
Lokal Biurowy No. 8, 8 Sapiezynska St., 00-215 Warsaw, Poland

FLORIDA
5201 West Kennedy Blvd., Ste. 124, Tampa, FL 33609, Tel.: (813) 849-7571

EGYPT
44 Gol Gamal St., Agouza, Giza, Egypt

FRANCE
Prof. Henri Broch,Universite of Nice, Faculté des Sciences,Parc Valrose, 06108, Nice cedex 2. France www.unice.fr/zetetics/

NEPAL
Humanist Association of Nepal, P.O. Box 5284, Kathmandu, Nepal Tel.: +977 125 7610

ARGENTINA
Av. Santa Fe 1145, 2do piso, C1059ABF, Buenos Aires, Tel.: 54-11-5273-6383

PERU
D. Casanova 430, Lima 14, Peru

INDIA
Innaiah Narisetti
A-60, Journalist Colony, Jubilee Hills, Hyderabad-500 033 India, Tel.: 91-040-23544067
http://innaiahn.tripod.com

EUROPE
Dr. Martin Mahner. Arheilger Weg 11, D-64380 Rossdorf, GermanyTel.: +49 6154 695023

MOSCOW
Professor Valeriĭ A. Kuvakin
119899 Russia, Moscow, Vorobevy Gory, Moscow State University, Philosophy Dept.

NIGERIA
P.O. Box 25269, Mapo, Ibadan, Oyo State, Nigeria Tel.: +234-2-2313699